VOLUME VI JUNE, 1913 NO. 6

Southern Medical Journal

Journal of The Southern Medical Association

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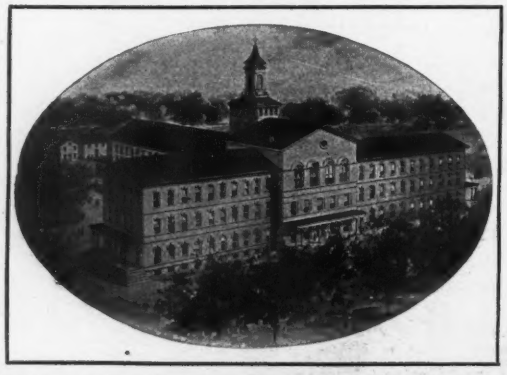

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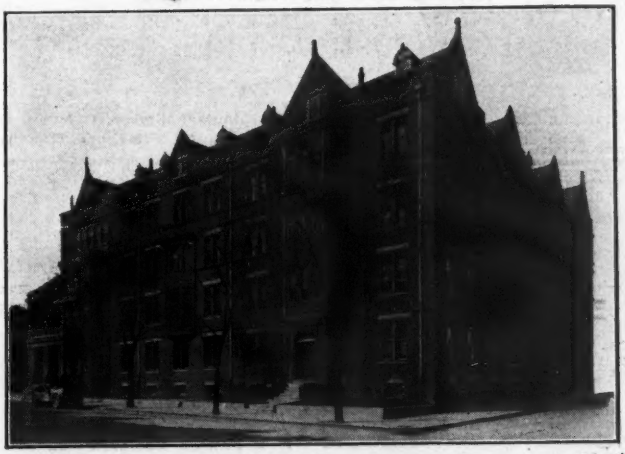

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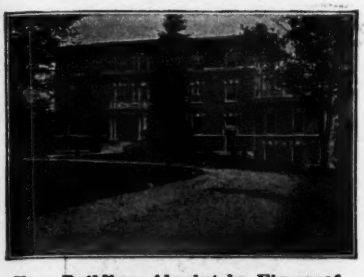

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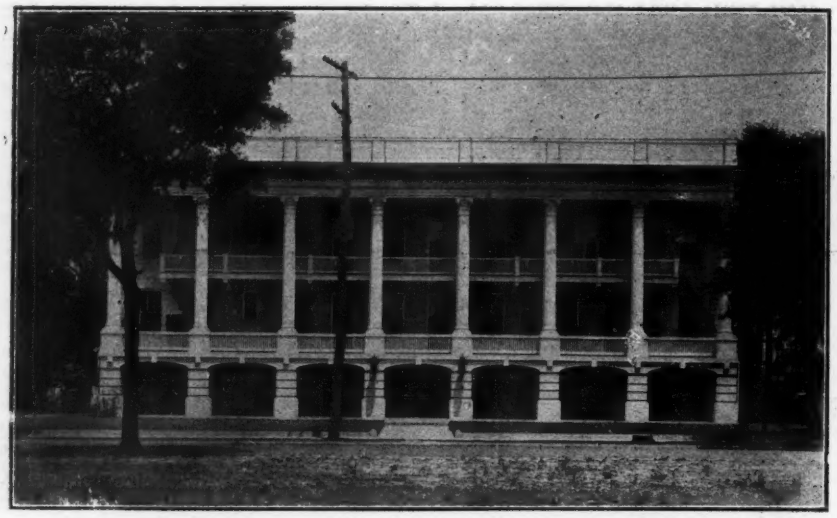

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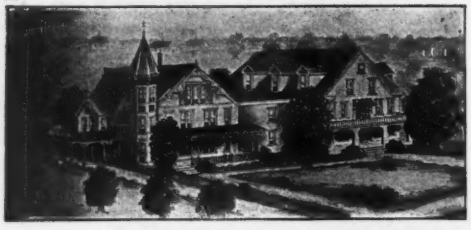

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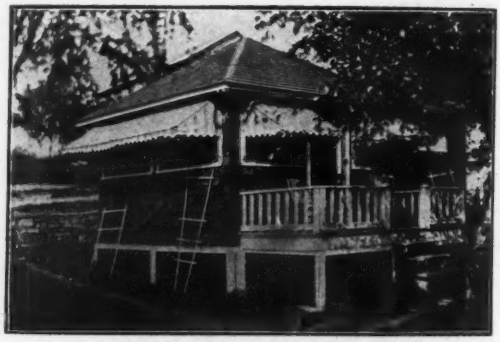

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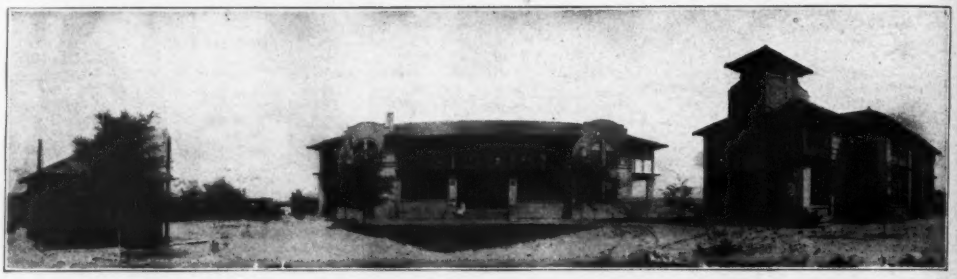

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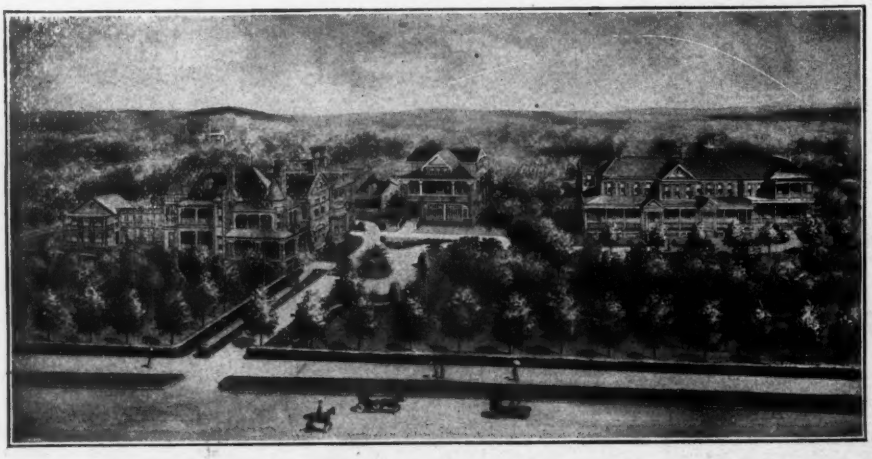

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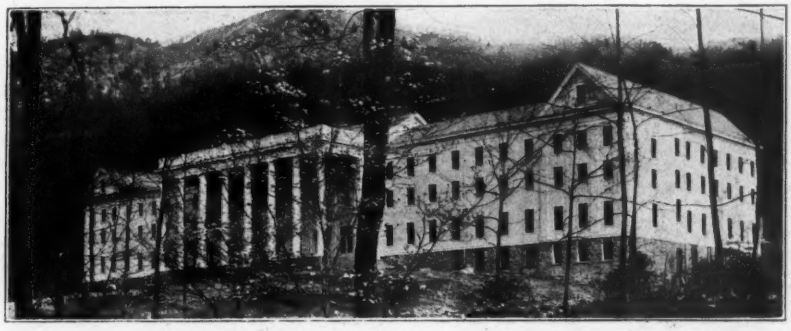

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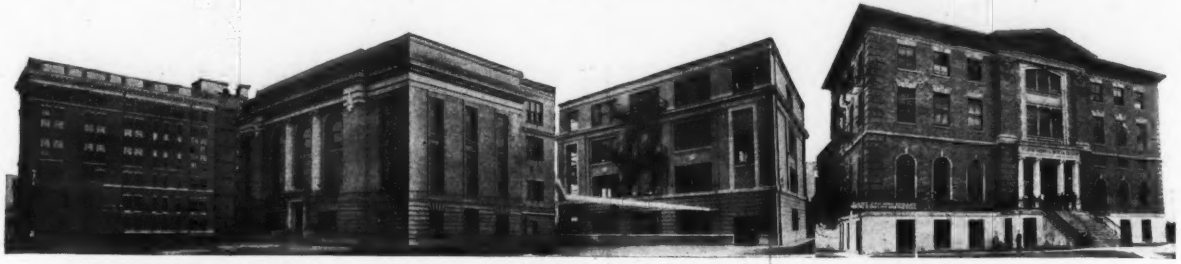

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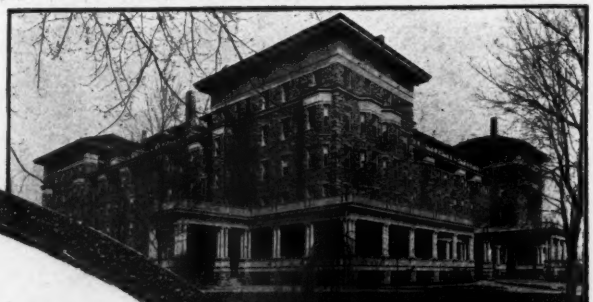

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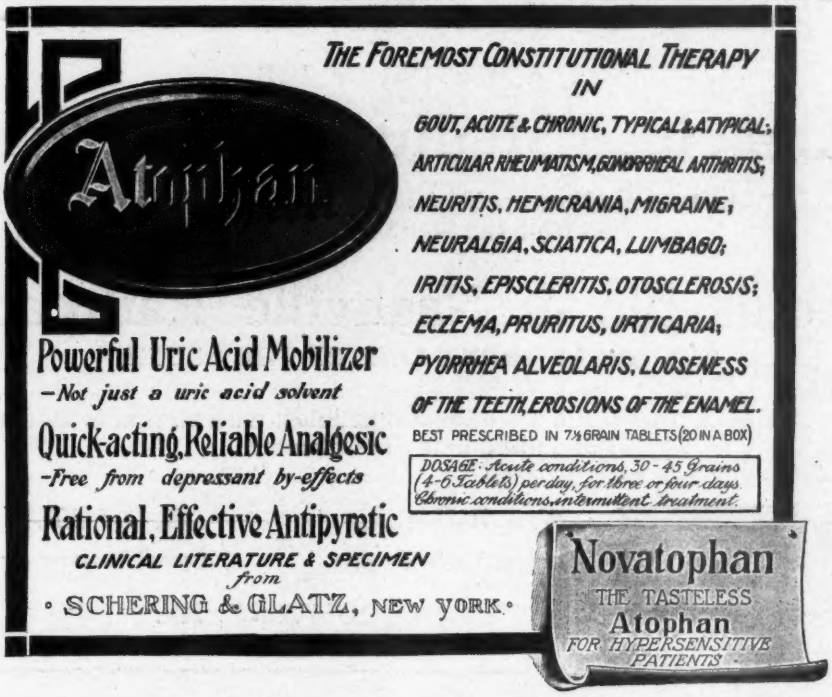
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Leave Decatur	L. & N. R. R.	11:29 P.M.	June 15th
Leave Nashville	L. & N. R. R.	3:10 A.M.	June 16th
Arrive Louisville	L. & N. R. R.	8:00 A.M.	June 16th
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SOUTHERN MEDICAL JOURNAL

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ORIGINAL ARTICLES

FLY-BORNE TYPHOID AND ITS CONTROL IN JACKSONVILLE.*

By Dr. C. E. Terry,
City Health Officer, Jacksonville, Fla.

It is not my intention, in reading this paper, to present any new facts in the carriage of typhoid fever by flies, nor to make any valuable contribution to the already abundant literature on fly transmission of intestinal diseases, but, rather, to state an experience which is, more or less, unique, I believe, in municipal sanitation.

The source of the water supply of Jacksonville, as well as systematic bacteriological examination of this supply have enabled us, we feel, to completely eliminate it as a factor in the spread of our typhoid fever. The entire absence of open wells, owing to a city ordinance prohibiting them, removes such source of water supply from consideration. The only other water supply that could have been questioned, in individual cases, is the driven, surface wells; and here again local conditions, namely, a perfect sand filter which our soil furnishes naturally, has enabled us, after repeated examinations for possible sewage contamination of these wells, to disregard them as factors in the spread of this disease.

The city water is artesian, from flowing wells of an average depth of a thousand feet. As it issues from these wells it is practically sterile, and, outside of contiguous breaks in sewer and water mains, there appears no opportunity for its contamination. No facts connected with any of our cases of typhoid fever would indicate that such an accident had ever occurred. Below is a table of the bacterial counts taken from reservoirs and taps in different portions of the city for the past three years, together with colon counts. It will be seen from a perusal of this table that our supply is of unusual purity.

Bacteria in city water during 1910, 1911 and 1912.

Source of sample	No. of samples	Average No. bacteria per C. C.	B. Coli.
City taps	26	20	Absent
Reservoir	21	22	Absent
New reservoir	1	10	Absent
Reserve basin	9	116	Present*
South aerating basin.	9	19	Absent
North aerating basin.	8	38	Absent

*The average of all counts is 23 bacteria per cubic centimeter exclusive of reserve basin. This basin is called upon only in case of emergency, such as large fires. It lies near Main street and is uncovered. Twice coli have been found in it, due, probably, to dust from the street and birds. In none of the other basins have we ever found coli.

Together with the elimination of the water supply as a possible cause of our typhoid, I have been able, since January, 1910, to eliminate milk as a factor, with the exception of three cases during the spring of the present year. The milk supply of every case occurring since January 1, 1910, has been determined, and in no instance has there been reason to believe that any milk route was at fault; in fact only 16.6 per cent of all cases during 1911 and 1912 used any cow's milk prior to the onset of the disease. Since January, 1911, a case record has been kept of all the local conditions surrounding each case, such as milk and water supply, location as to privy or sewer districts, recent contact with known cases, eating places, screening, etc., etc.

With the elimination of water and milk, ordinarily the two main factors in the distribution of typhoid fever, it became apparent that some other common condition must be sought in order to account for the undue prevalence of the disease. There remained in my mind but two possibilities worthy of much consideration, contact cases and those due to fly-carriage. My attention was first called to the possible agency of the fly while I was doing general practice in this city, prior to my appointment as health officer, principally by the seasonal incidence of the disease. After my appointment, January 1, 1910, the distribution of

*Read at the sixth annual meeting of the Southern Medical Association, Jacksonville, Fla., Nov. 12-14, 1912.

the cases was found to be such as to corroborate this belief. In my annual report for that year this statement occurs:

"Until 1908, typhoid and tuberculosis were not reportable diseases, and for 1909 the case reports were very incomplete, as the physicians were not aware that these diseases had been added to the list. During this year every effort has been made to call the matter to their attention and secure their co-operation, with the result that 329 typhoid cases have been reported. With sixty-two deaths, this gives a mortality of 19 per cent, from which I conclude that the case reports are not complete, the mortality generally accredited to the disease being 8 per cent. Typhoid began to increase in April, reached its height the last week in July, and declined rapidly afterward, in November only seven cases being reported. It is the belief of this department that the prevalence of the disease was due, to a large extent, to the combination of open privies and flies and other insect carriers. The fly season was carefully watched and began in March, reaching its height at the end of the first week in July, and, within two months, there were very few flies to be seen. This alone proves little, but the distribution of the disease would seem to bear out the argument.

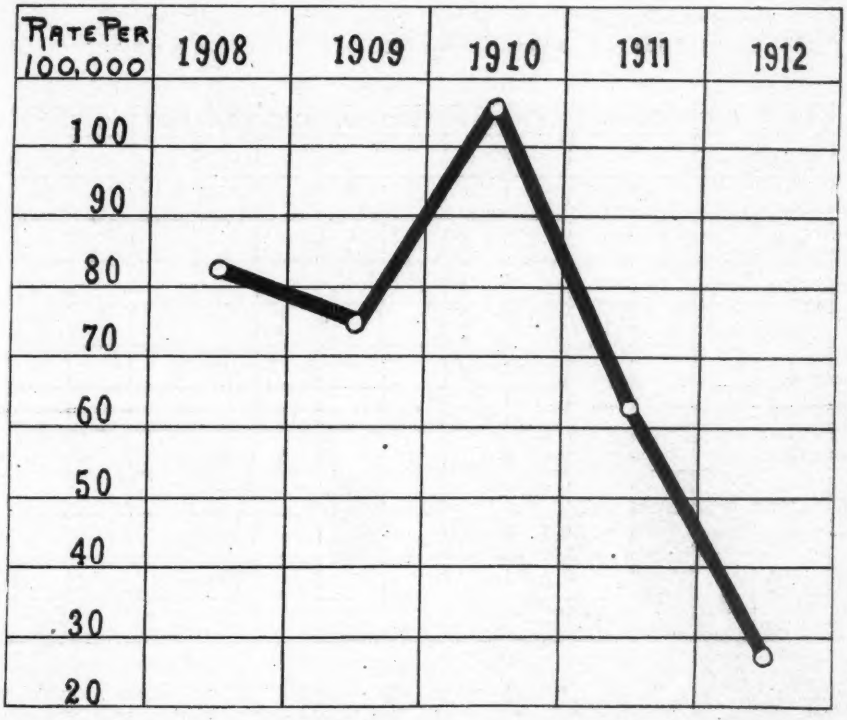
"Until the middle of July 75 per cent of the cases were in the privy district, only 25 per cent in the sewer district. After this date the percentage in the privy district dropped slowly as contact cases increased, but, for the whole year, the percentage in the privy district was 60, notwithstanding the fact that this district comprises only about one-third of the population, the relative percentage being about 80."

The conditions existing in the privy district at that time were such as to further in every way fly-transmission of intestinal diseases. There were about 8,500 privies in the city, which accommodated 40 per cent of our populaton. Had these privies been confined to any particular locality their existence would not have entailed such a widespread distribution of infection, but they were about evenly distributed throughout every section of the city. In fact, there was, at that time, no point, within the city limits of Jacksonville, further than nine blocks from one or the other of the privy districts, while about 75 per cent of the population lived either in this district or within three or four blocks of it, notwithstanding the fact that their own premises may have had sewer connections.

These 8,500 privies were such as are commonly seen in rural districts, and I can truthfully say that not a single one made the slightest pretense of protection against flies; indeed, so poorly were they constructed that many had no backboards, and more than one householder objected to the visit of the city scavenger on the grounds that the chickens did his work to the entire satisfaction of the family. Few had seat covers; all had wide cracks and unscreened windows, and many of these privies, in the poorer negro settlements, lacked even doors, denying to the occupant the privacy which the name would indicate, could we rely on etymology for meaning. A large proportion of these privies existed in thickly settled districts where only a few feet separated the cottages, and where small yards required the placing of the privy close to the kitchen windows. In many instances, where a number of houses were owned by the same landlord, to economize space and money, one community privy would be found within twenty-five or thirty feet of from three to six kitchens. Screens are not furnished to this class of tenants. Each privy was a reeking mass of filth, swarming with flies which abandoned it only when the odor of cooking attracted them through the nearby windows. Surely here were present the three essentials to fly-carriage of intestinal diseases, exposed human excrement, unprotected food supplies and an abundance of flies. Ignorance and disregard for decency could scarcely have devised more ideal conditions for the dissemination of intestinal infections.

I regret that prior to 1910 scarcely any case reports were made to the health office, so that I can not determine the distribution of the disease before that period. The deaths, however, furnish sufficient information to show that its seasonal prevalence was the same as for the past three years. In 1910 we had a considerable increase in the number of deaths over the preceding two years. I attribute this increase in part to more accurate data, and to the fact that the city had grown so rapidly during this period that sewerage extension lagged far behind the requirements, and each year the number of new privies constructed outnumbered the new sewer connections. At the same time, in default of any law governing the construction and maintenance of these places, the old ones were falling constantly into a worse state of repair. The following chart shows the typhoid death rate for the years 1908 to 1912, inclusive (1912 is estimated as accurately as possible from the figures available at the date of writing, November 6):

During 1910 our attention was early called to the distribution of the cases, and it was also noted that a marked increase occurred after the onset of the fly season. Careful observations on the prevalence of flies were made, during this season, about the public dumps and stables, and they reached their height, as already stated, about the end of the first week in July, while the same month furnished the high-water mark of the typhoid cases reported. The following chart shows the fly and typhoid curves for that year:



Acting on this assumption, we succeeded, in August, 1910, in securing the passage of an ordinance requiring all privies to be rendered fly-proof. This ordinance was modeled after the one devised by Dr. Levy, of Richmond. Its enforcement was begun at once and by April 1, 1911, the beginning of the fly season, between 80 and 85 per cent of all privies had been reconstructed according to its requirements. The ordinance required tight construction, the screening of ventilating openings, self-closing doors and seat covers and well-fitting, hinged backboards. In order to avoid, as far as possible, imposing unnecessary hardships upon property owners, the law was so framed as to permit the repairing of privies already constructed, where it was possible, in this manner to ensure fly-proofing. Where, however, such repairs would not have accomplished the desired result, entire new construction was required.

Beginning with January, 1911, the department has required that the sick room, in every case of typhoid, be screened and the flies destroyed by means of poison or sticky fly paper. This routine has been carried out by detailing an inspector to visit each case every other day from the time of its reporting until convalescence is established. Where the financial condition of the family renders the screening of the sick room a hardship, mosquito netting, sticky fly paper and disinfectants have been furnished by this department, and their use strictly enforced and watched. Printed instructions supplement verbal ones in each case.

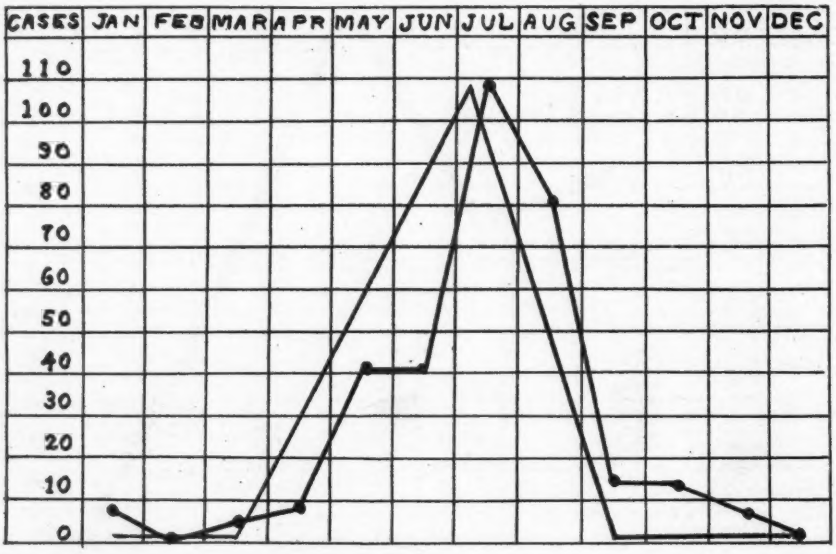
As a result, I believe, of the screening of the privies and sick rooms, the number of cases of typhoid reported to the Health Department during 1911 was 148 against 329 for 1910, the deaths for

the same years being 40 against 62. There was actually a greater reduction in the number of cases, as the reports for 1911 were more complete than those of 1910. Not only did this reduction occur, but we found that the distribution of the cases as to privy or sewer districts was practically reversed in 1911 from that of 1910, showing no disproportion of cases in the privy districts. This is shown diagrammatically in the accompanying chart. In 1911 cases were distributed according to population, regardless of methods of sewage disposal.

It is interesting to note that of the 158 cases occurring in Jacksonville during 1911, 88, or 55 per cent, were imported, the large majority from the surrounding country districts, where the privy and "back lot" unite to solve the question of sewage disposal. A large proportion of these cases are imported in the summer and from rural communities where typhoid is continuously epidemic In all of these settlements open privies are used. During 1911 the enforcing of the privy ordinance was vigorously pushed, and by January, 1912, these places were in as nearly a sanitary condition as it is possible to keep them where 50 per cent of the population is composed of negroes devoid of responsibility, and others of the type who look with ridicule upon the necessity for care in the disposition of human excrement, or who are too indifferent to matters concerning the public welfare to observe more than the naked letter of the law.

The enforcement of this ordinance has cost property owners a large amount, and it was not accomplished without considerable opposition from various sources, but the results obtained have removed most of the objections, and during the past year notices to repair or reconstruct dilapidated privies have generally met with prompt, if not always cheerful, response.

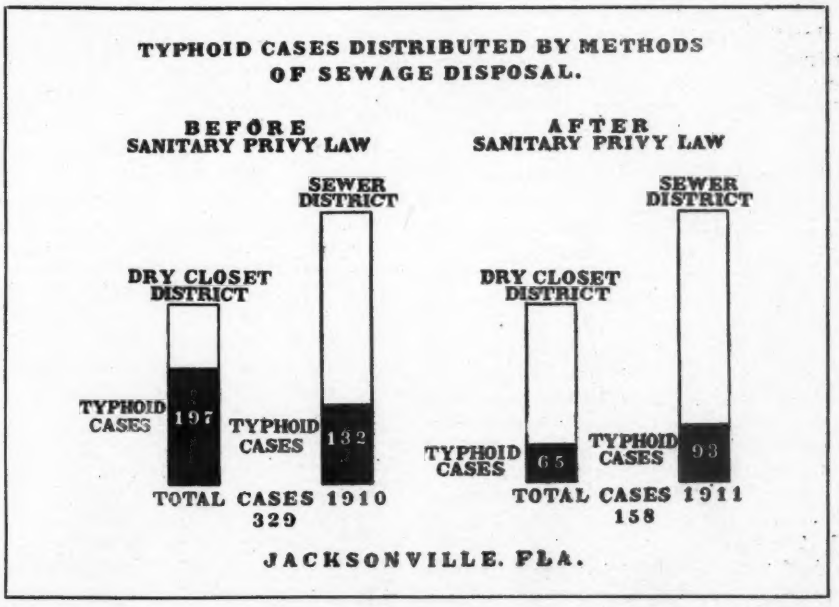
The most marked reduction in the typhoid case and death rate has taken place this year. At the present writing we have had only 87 cases reported, with 16 deaths. Of these, 48 acquired their infection elsewhere and were brought here for treatment. In only 39 cases could the infection be charged to Jacksonville. Three of these cases and one death were due to infected milk of a privately owned cow which supplied three families, a needless sacrifice to ignorance. Estimating as accurately as possible at this date, our typhoid rate for 1912 will not exceed 28.4 per 100,000 against 106.3 for 1910, before the enforcement of the privy law. The accompanying chart shows the typhoid incidence from January 1, 1910, to date, together with the various stages of enforcement of the privy ordinance.



I am fully aware that the facts above stated do not furnish all the requirements of strictly scientific proof that our typhoid was, for the most part,

fly-borne, but it would appear that this were the case, as the only measures we have made use of to reduce our typhoid rate have been directed against this insect, and the only change in sanitary conditions throughout the city has been the fly-proofing of the privies. Contact has undoubtedly played its part, as it does everywhere, but in view of the fact that our water and milk supplies could be eliminated, as already stated, I feel that we are justified in attributing the major portion of our cases, prior to the enforcement of the privy law, to the housefly.

There arises, in this connnection, a point of considerable scientific interest, namely, just how the disease is transmitted by the fly. We have been taught that the fly infects food by means of the specific bacilli carried on its feet from infectious material. The commission appointed to investigate the causes of typhoid prevalence during the Spanish-American War call attention to the fact that flies "with their feet whitened with lime, from the latrines," were seen walking over the food of the soldiers in the mess tents and kitchens. It has also been demonstrated by several investigators that flies fed on infected material will deposit the typhoid bacillus in their specks. Major N. Faichnie, R. A. M. C., in the November (1909) number of the Journal of the Royal Army Medical Corps, presents a most interesting paper on the exact source of this infection. It is his opinion that neither the legs of the flies "nor their excreta when they feed on the contents of latrines are common vehicles of fly-borne infection," quoting further from Major Faichnie; "but, on the other hand, the chief and most common method is by excrement when the flies are bred in an enteric infected material. By this I mean that one station may swarm with flies, bred only from the excreta of cows and horses, and yet have no enteric, while another place, where there are very few flies, but where these are bred from human excreta either in or out of the station, may have an epidemic, the source of infection being the excrement of the flies, and the insects themselves being carriers."



Major Faichnie, in his report, adduces considerable evidence to support his contention. In view of his observations and some experiments which Dr. McKay and I conducted in 1911, I am inclined to believe that at least the fly bred in infectious material is a carrier for a longer period and hence more dangerous than the insect obtaining its infection through contact or feeding after maturity. It is a matter that is worthy of careful investigation. The fly-proofing of privies, however, is protection against either mode of infection and I am convinced from inspections made of these places prior to the passage of our screen-

ing ordinance, that, second only to stables, they furnished the most prolific fly hatcheries in the city.

What is true of Jacksonville is, I believe, true of many of our Southern towns and cities where the sewerage systems are inadequate to the requirements and where the old type of privy is in common use, and in such communities I am convinced that the screening of these places will bear fruit in reducing typhoid mortality as it has in Richmond, Asheville and this city. The old type of privy is an abomination and even the best is but a poor substitute for the sewer, but in the South, where lack of public funds, the poverty of large numbers of our people, and, as everywhere, politics retard sewerage extension, and where climatic conditions prolong the fly season, the rendering fly-proof of these places is a necessity if we would secure even reasonable immunity from the infections they entail.

THE PRESENT STATUS OF OUR KNOWLEDGE REGARDING THE TRANSMISSION OF TYPHOID FEVER.

By Allen W. Freeman, M.D.,
Richmond, Va.

With the possible exception of tuberculosis, there is no disease in all the long catalogue of those classed as infectious which has been more studied than has typhoid fever. Both diseases present complex epidemiology, and in both effective practical prevention has come only after long and arduous study. The epidemiology of typhoid has become more complex as our knowledge has increased. The infectious agent of the disease is a collateral, if not a lineal, descendant of certain non-pathogenic organisms normally resident in the intestine of man, and while not as well fitted for survival outside the body as the tubercle bacillus with its armor plate of wax, can survive for a long enough time and under sufficiently varied conditions to render the study of its transmission difficult in the extreme.

Prior to the discovery of the specific etiological agent of typhoid fever, the studies which were made were for the most part fragmentary and unsatisfactory, and until the time of Budd, whose immortal work has never received the recognition which it deserves, nothing of great value in the specific prevention of the disease had been recorded. Budd, whose researches will always remain a model for pure epidemiology, clearly established the infectious nature of the disease, located the infectious agent in the excreta of the patient and laid the foundation for our modern ideas regarding the disease. This discovery of the infectious agent, coming shortly after the publication of Budd's work, gave great impetus to the prevention of typhoid fever, and from that time to this the history of sanitary science records a continuous series of triumphs over the disease.

At the present time, in summing up our knowledge regarding typhoid fever, we may say without hesitation that it is caused by the bacillus typhosus of Eberth. The work of Metchnikoff and Desredke, together with the results of antityphoid vaccination, have disproved forever the theory so frequently advanced, that typhoid is of the same nature as swine cholera, and the typhoid bacillus only a secondary invader, the real infectious agent being a filterable virus to be found in the blood.

We may say, too, with certainty that the typhoid bacillus is of much wider distribution than was thought, even up to a few years ago. It is to be found in the discharges not only of the patient, but of many healthy persons, who may or may not have had the disease, and in the discharges of many persons who are sick with intestinal fevers so mild as to bear little or no clinical resemblance to true typhoid fever.

We have learned within the past few years that the typhoid bacillus is disseminated not only by water and milk, and occasionally by other foods, as was formerly thought, but equally as well by flies and fingers, and, in fact, by almost any material object which comes in contact with human filth, and directly or indirectly with human mouths. We have learned by sad experience that the measure of typhoid fever in any community is the measure of the distribution of human filth in that community, and that the dissemination of human excrement will inevitably result in the spread of typhoid fever.

Water has, of course, long been regarded as the great carrier of typhoid infection, and rightly so. Sometimes in epidemics, sometimes in the continuous infection of a large population, sometimes in scattering single cases, water must be held responsible for a considerable proportion of our typhoid. Without adequately protected or purified public and private water supplies, typhoid prevention is impossible.

Milk has, likewise, for many years, been regarded as a most important vehicle for typhoid infection. Epidemics without number have been caused by infection of milk supplies. Experience,

dearly bought, has demonstrated that even the most rigid inspection of milk supplies cannot prevent the occasional infection of a public supply, and that real protection against typhoid fever from infection of milk supplies is to be purchased only at the expense of Pasteurization under municipal supervision.

Other food causes of typhoid infection have received much attention, but in spite of much study, but little has been learned as to their real importance. We have seen much agitation of recent years in regard to the role played by shell fish, and particularly oysters, in the transmission of typhoid. A careful study of the evidence would seem to show that while an occasional outbreak of typhoid has been found to be due to infection of oysters, in such cases the pollution has been obvious and inexcusable, such as the fattening of oysters in the harbors of large cities or even at the mouths of sewers. We believe that for the most part the average market oyster is not the cause of any great proportion of our typhoid and is, in fact, about as safe as any of the foods which we are in the habit of eating uncooked.

Typhoid in Cities and Towns

The studies which have been made of the prevalence of typhoid fever in the cities and towns of the United States have revealed much that is of value in the prevention of the disease. The relative value of water purification, general sanitation and food protection have been worked out in detail, and the practical prevention of the disease has been made almost an exact science.

Every one knows, of course, that frequent explosive outbreaks of typhoid fever have occurred as a result of the infection of public water supplies. From such supplies the typhoid bacillus has been recovered so frequently as to leave no doubt of the accuracy of the results. It has been proved too many times to admit of further question, that the use of an impure water supply by a community will result in a continuously high typhoid death rate, and that purification of such a water supply will result in a marked and immediate lowering of the death rate.

In cities in the more northern sections of the United States, the purification of a public water supply of a city will result in the reduction of the typhoid death rate to a figure usually under twenty per hundred thousand. In the South the purification of the public water supply, will, in the absence of other measures, seldom bring the figure below fifty per hundred thousand. In a Southern city possessing a pure public water supply, the sanitation of the city, and by sanitation is meant the complete protection of human filth in the community by perfect sewering or by rigid screening and supervision of dry closets, will usually result in reducing the typhoid death rate to the figure usually reached by the Northern city from water purification alone, namely, twenty per one hundred thousand. Unfortunately, no figures are available as to the result of the perfect sewering of any Southern city of considerable size, as, so far as we are aware, such a city is not to be found.

No more important addition has been made to our knowledge of the practical prevention of typhoid fever in urban communities than the facts which have come to light as regards the importance of protecting the people of any community against that infection which is not brought in from without the city gates, but which is generated within, and disseminated from foci close at hand. When we seek to work out a plan of protection for the citizens of any community against typhoid, we should classify accurately our sources of infection into two groups. We should first consider those sources of exogenous infection, without the city, from which infection is brought in usually in water, milk or other foods, and which are guarded against by water purification and milk and food inspection. We should by no means neglect those sources of endogenous infection, within the city, whence typhoid is distributed by an almost infinite variety of means, and which must be guarded against by what we speak of as general sanitary measures, such as sewerage, sanitary inspection, fly prevention, and in addition by the very especial supervision of the known case of typhoid fever.

Typhoid Fever in Rural Districts.

It is to be regretted that our knowledge regarding the transmission and prevention of typhoid fever in rural districts is far from being as complete as that regarding urban conditions. The subject is one which has been studied but little in this country, notwithstanding the fact that in many of our States typhoid is almost entirely a rural problem. We have learned, however, some facts regarding the transmission of typhoid in rural districts which are of value in practical prevention. We know that, in most cases, water infection has but little to do with the spread of the disease; that existing sanitary conditions in rural districts are utterly inadequate for the proper safeguarding of human filth, and that the general dissemination of fecal matter consequent upon the presence of these insanitary conditions is inevitably followed by the presence of typhoid fever.

We know, too, that the country people at the present time have not learned those precautions which are absolutely necessary to prevent the spread of the disease from the bedside of the patient, and that frequently the disease is spread over large areas of country by contact alone. From our knowledge of the transmission of typhoid, taking into account the isolation and lack of intercommunication of the country people, we may confidently expect that an improvement in the sanitary arrangements of our farms, specifically in the building of a sanitary privy for every home, and a more careful observance of the precautions of the sick room, will result in a marked decrease in the presence of typhoid fever in rural districts.

Anti-Typhoid Vaccination.

The results already obtained indicate clearly that vaccination with killed cultures of the typhoid bacillus confers upon the individual marked resistance to typhoid infection. In military organizations the great value of this method of protection has already been demonstrated and results are rapidly accumulating to show that in civic populations the method may also be of great service in the prevention of endemic and possibly of epidemic typhoid.

Summing up, we may say that the essential basis for the prevention of typhoid fever has been laid and that we are now in possession of the information, biological and technical, necessary for the actual eradication of the disease from the urban communities of the United States. The basis for prevention in rural communities, while not complete, is sufficiently certain to insure a great reduction in present rates. The problem is no longer an investigative or scientific problem, but a problem of administration. When the people of the United States wish to pay for absolute protection against typhoid fever it can be bought with the full assurance that the goods can be delivered.

Unknown Problems in Typhoid Epidemiolcgy.

While the information necessary for the practical prevention of typhoid is sufficiently complete for practical purposes, it must not be assumed that there are not interesting scientific problems awaiting solutions. The whole question of the seasonable prevalence of the disease is one which offers wide ground for fascinating speculations and even more fascinating research. Why does typhoid fever follow an annual curve almost as unvarying as the seasons, and almost parallel with the temperature curve? Is it a question of the dissemination of the virus or of the resistance of the community? Are we less resistant in winter as some, in reading the curves of cities using grossly polluted waters, would have us believe? Or are we less resistant in summer, as those of us who study rural typhoid are led to believe? Is the fact that flies breed in warm weather responsible for a summer prevalence of typhoid such as that of Virginia? Is there a shifting of the balance of the blood supply of the body from the periphery to the deeper organs in winter and back again in summer, as North has recently suggested, which shifting accounts for the prevalence of respiratory disease in winter and intestinal disease in summer? Is there a variation in the flora of the body with the changing seasons as there is in the flora of the outside world, which variation accounts for these seasonal differences? These and other like speculations must wait for further investiagtions.

As physicians and sanitarians, we are most interested in the practical question—can typhoid fever be prevented? We know that it can. We know that our methods are certain, that they will yield the desired result in every case where they are properly applied. The problem remaining for solution is, how to convince the American people that protection from typhoid fever is something worth spending money for.

DISCUSSION.

Dr. A. E. Campbell, Chicago—My wife and daughter, who are here with me, are greatly surprised to find so many flies in Jacksonville. You have more than we have in the North. I should like to make a suggestion regarding flies. Why not begin war against the fly before he matures and prevent his growth? A few years ago I was asked to read a paper before our High School on Preventive Medicine, and in the preparation for that work I found that the fly was cradled in manure and filth, so early that spring I had the man clean up around the barn, removing all manure, filling in all depressions, using oil and lime freely. All the neighbors in the block did the same, and to our surprise we had practically no flies that season. I think if we begin early and have a general clean-up we will not have so many flies to screen against. I have a friend who spent the months of August and September in New York. He tells me there were no flies there and no screens in the hotel windows where he was, but all around was scrupulously clean. But New York is a large place, and this friend spoke only of what existed in this neighborhood, but this shows what can be done. Let each individual keep his premises clean and urge his neighbor to do likewise. In other words, use oil and lime to prevent the growth of flies instead of screens to prevent their entrance to privy vaults and our houses.

The Illinois Central had an outbreak of typhoid fever among its employes late one fall, and I was asked to look into the cause of it. It was

in the northern part of Illinois and long after flies were extinct. I looked into the water supply and found that city water was used by all citizens, and our employes only were ill. The milk supply was also looked into, and many others in the same neighborhood were using the same milk and had no trouble. The sick men had taken their lunches with them, and water also; and had not drunk or eaten anything outside so far as we were able to determine.

I tore up the floor in the shop and found water standing under the floor. There was a drain on each side which drained the surface water only. We simply ran a six-inch red tile through the building, with branches on each side, and the trouble ceased. I believe some diseases are air-borne, at least a small fraction of them, although this is not according to the generally accepted theory of the transmission of disease, but I notice those who strictly adhere to this belief have never advocated public funerals after a person has died of confluent smallpox or scarlet fever.

The English surgeons in South Africa claimed that a damp atmosphere was conducive to this disease. They did not screen their tents, as they had no flies; ate in the open during the Boer war, and they had a great many cases of typhoid fever, and claimed that contamination was carried in the air.

I had the misfortune to have an infected finger some years ago and was confined in a hospital during the months of March and April. There were a few cases of typhoid fever brought into the hospital while I was there, and one of the internes took typhoid fever and died. He did not wait on any of those cases, and I am informed was not near them. Two nurses also took the disease, but recovered. These nurses did not go near the doctor nor the others who were sick. Here are three cases of typhoid infection in a hospital, where there are no flies, no water contamination and no sewage contamination. How can we account for this?

We use crude petroleum in the closets along the line, as far as we can, and recommend that the seat be painted or brushed with this every other day. The fly hates crude oil and will not go near it, and in this way we endeavor to keep them out of the closets.

One more word: I have practiced long enough to realize that many cases are called typhoid fever that are not typhoid at all. And I make the broad assertion that there is not a disease known to the human race that so many mistakes are made about as typhoid fever. There are many, many fallacies in laboratory diagnosis.

Dr. A. W. Freeman, Richmond, Va.—I feel a little hesitancy in reading a brief, more or less theoretical paper, after hearing the beautifully practical paper to which we have just listened. All of us who have followed the development of our ideas with regard to typhoid fever have been interested in the work done in Jacksonville, so convincingly reported today by Dr. Terry. The purpose of my paper is simply to state briefly some of the things in regard to which we who have been working on typhoid in the South have never gotten our Northern friends straight. (See article on another page.)

Dr. Victor Bassett, Savannah, Ga.—Dr. Terry has produced evidence that has fully convinced me of the importance of the fly in municipal typhoid fever. We know from the studies made in Canton that the fly does carry typhoid at times, under special conditions, there; but I have always been skeptical of its being a general carrier of the disease in cities, for the reason that cities that have practically very few dry closets have also this sporadic typhoid. It might be an interesting study to compare the sporadic typhoid in cities with reference to the number of these closets. The water supply also varies, and it would be difficult to estimate the exact value of dry closets. In Savannah we have very few of these dry closets, and we shall eliminate every one of them within a short time; yet we have typhoid, although we do not have so much as Jacksonville did have. When the people asked us about typhoid in Savannah, we used to acknowledge that we had some, but said that we had not so much as Jacksonville; but now we shall have to look to our laurels.

An interesting thing about the fly is that it breeds early in the South. Therefore, we have our typhoid early. In the North, the fly season is late, and the typhoid is also late. Studies of that kind might be instituted, to determine the value of the fly in connection with typhoid.

I want to answer the gentleman from Illinois, who said that flies are more prevalent down here than they are in his State. I grew up in Illinois, and I believe that flies are less common in the South than up there. It was a surprise to me to find it so. They may be more common in Jacksonville, but it is certain that throughout the South flies are not so bad as one might expect from the higher temperature. I do not believe they are so common in the South as in the North.

With regard to Dr. Freeman's paper, I would say that I want to disagree with him in one thing, and that is, that no system of inspection will absolutely guard against typhoid borne by milk, for the reason that the inspector cannot be on the job all the time. It is said that in Chicago the dairies are visited by the inspector only about once in two years. That is so seldom that the personal influence of the inspector is practically negatived. Even where he may make a monthly or a weekly visit, how can he know that during his absence the technique is not dropped and mistakes made? Then we have the element of human weakness, which may come in. A single mistake may precipitate an epidemic, just as it may cause a wreck. Therefore, we must depend, as a preventive of a milk-borne epidemic, upon Pasteurization. I regret this, because Pasteurization can be carried on only in the larger dairies, and this will eliminate to a certain extent the small dairies. Yet the smaller dairies can give us the best un-Pasteurized milk. If we could be certain to avoid the element of danger arising from carelessness and accidents, the small dairy would give us the best milk, but if we depend on Pasteurization, we must depend on organization of the milk industry.

Dr. Joseph Goldberger, Washington, D. C. (U. S. Public Health Service)—The papers that have been read this morning epitomize very well the theoretical and practical knowledge in regard to sanitation against typhoid. As Dr. Freeman very well said, there has really not been very much

added to our knowledge, our sanitary knowledge, of typhoid since Budd's time; yet, as he also indicated, that fact was not appreciated then, and probably will not be for a long time to come. The fact is, however, that we do know how to eliminate typhoid fever, and the remarkable thing is that it is not being eliminated very rapidly. That is a very important practical fact, and one naturally likes to inquire why that fact is so. One reason, and an important one, is that, speaking broadly, we have no efficient health officers to carry into effect the knowledge that we already possess on the subject. As an illustration of that truth, I have simply to cite the work done here by Dr. Terry; it shows what an intelligent and really efficient health officer can do. As soon as we have efficient health officers everywhere, and not until then, are we going to eliminate typhoid fever. What we want now is not more knowledge about the disease, but more and better health officers, and that means better-paid health officers. an important and essential corollary to my first proposition. You cannot get a health officer who is efficient, as a general proposition, unless you pay him decently and take his office out of the mutations of politics.

Dr. Hiram Byrd, Jacksonville, Fla.—Dr. Terry made the statement that he does not consider that his work here is conclusive of the great importance of the fly in connection with typhoid fever. I am rather inclined to take issue with him. He weakened his evidence by making mention of a contiguous break in the water mains and the sewers. I think that the water pressure is anywhere from sixty to eighty pounds, so that in the event of a break, I do not see how it would be a mechanical possibility to get a water main contaminated. The flow would be strongly outward, instead of inward, and I hardly can conceive of a condition in which you could, with a minimal pressure of sixty pounds, get a water main contaminated. I am fully aware of the fact that there may be a back pressure exerted when mains are laid in a heavy clay or rock bed, in suddenly lowering pressure, but in a sand bed like this, I must confess that I am not engineer enough to see how it can be done.

There is another point that I think has not been sufficiently emphasized in our typhoid epidemiology. There is no doubt in my mind that the prevalence of typhoid in a community or municipality eventually sets up a vicious circle. The more you have, the more you will have. The more you have, the more possibilities there are for the spread of the disease. It is like trying to start a fire on a cold morning. It may burn very slowly, and if you cannot get it up to a certain point of heat, it will go out. If it does not go out, however, it burns more and more vigorously, on account of its own presence, and there is no doubt that this same influence is manifested in many places with regard to typhoid fever. If you can just reduce the typhoid to a certain point, the chance of infection becomes so much reduced that this, of itself, will go on and multiply the reduction. The law of chance really does it. The vicious circle is broken, and that helps to reduce the number of cases of fever.

To further discuss these papers it seems, from my standpoint, at least, is superfluous, for they are papers worth going any distance to hear. Both are most excellent in their entirety.

Dr. J. A. Hayne, Columbia, S. C.—In the discussion of typhoid, it has been suggested to me by one of the doctors present that we have all failed to name one of the principal carriers of the disease, namely, the physician—that is, indirectly. The ordinary, average common or garden physician in South Carolina, at least, seems to have a very slight conception of how typhoid fever is conveyed. He loves to come to meetings and hear some of our interesting lecturers throughout the State, when they strike an attitude and speak of "As the science of sanitation reaches the meridian, so the shadow of death shortens," and he applauds this sentiment, but he does not take the matter at all to heart. He goes home and has a case of typhoid fever. He has heard that it is conveyed by flies, by fingers, by water and by food—all these ways, but does he try to prevent it? No. Rarely does he even sterilize his thermometer after taking a typhoid fever temperature. He sticks it in a patient's mouth, put it back in his case, and carries it to the next patient. I know that to be so in South Carolina, and I am simply speaking of my own State. He does not even put a mosquito net over the windows, to prevent the egress or ingress of the flies. He does not carry out concurrent disinfection, which is more important than terminal disinfection. He does not sterilize the feces as they are passed, nor the discharges from the patient, and it is the physician who is a very large factor, who plays a very important part in the carrying of this disease.

In our State, we have attempted to do away with this, if possible, by having the people, in the houses where the doctor refuses to protect them properly, immunized by typhoid fever bacterin. We have explained to them carefully that it is not given with a spoon. I have seen a moving picture film representing the administration of anti-toxin, in which, as a climax, the physician administers it with a spoon We have given out in the State twenty thousand ampules of typhoid bacterin, and believe that we have successfully immunized many thousands of people against the disease. If we can do that every year, and surround each focus of typhoid fever with a zone of immunized people, we can prevent further spread of the infection while we are educating the physician, not to know what to do, but to do what he knows. That is the thing.

Dr. David Rose, Sebastian, Fla.—Regarding the connection between typhoid fever and the sewers and the water supply, I wish to say that there was an epidemic of typhoid fever in a suburb of Chicago a few years ago, and the doctors had difficulty in finding the cause. After a good deal of search, they discovered a break in a water pipe connection with a sewer. After remedying that, the epidemic immediately ceased.

I practiced medicine in Chicago a few years before the opening of the drainage canal, when all the sewers emptied into Lake Michigan, where the city gets its water supply. In the rainy season I had many typhoid fever patients, and was kept busy from morning to night every day during September, October, November and December in visiting these patients. When the drain-

age canal was opened, and the sewage was turned into the Mississippi River, I did not average a case of typhoid a year from that time until I left Chicago.

Dr. W. A. Boyd, Columbia, S. C.—I agree very heartily with the doctor who stated, a while ago, that he thought that we had reached a point where we had learned so many measures, so many ways of the transmission of typhoid fever, that it was about time for us to devote a larger part of our energies to overcoming these conditions. Dr. Hayne has stolen somewhat of my thunder, because, as I stated at the meeting of the American Public Health Association in Havana, I believe that the physician is in large measure responsible for the spread of typhoid fever. My coming to that conclusion was the result of actual work and investigation. In my home town, from a study of sixty-one cases of typhoid fever patients whose families were visited and a complete chart and record made of the cases, it was found that in thirty-eight of these cases absolutely no instructions whatever had been given to any member of the family as to how to care for the patient and prevent the spread of the disease to other members of the family or the neighbors. That is a sad condition of affairs. Really, it is a disgrace to us men of the medical profession. To overcome it, I believe that the health departments should make it a rule to personally send an appeal to the members of each patient's family, giving them the reasons for care that the family physician often will not give. Let us, then, start on a campaign of education, letting the people know that we now have a typhoid vaccine that will absolutely prevent the disease and give them immunity to typhoid, without danger to themselves.

Dr. J. D. Bennett, Clearwater, Fla.—This subject, the cause of typhoid fever, is little understood. Any of these diseases, chills, measles or typhoid, is worse in unsanitary surroundings; cases are more frequent and harder to manage. I found this to be true throughout a long practice in Illinois, and from my experience there believe typhoid to be the only one of the three that is air borne. We had typhoid fever throughout the coldest winters with no flies to carry the germs.

One thing I might mention which does not come under the head of preventive medicine is that to the kind of M. D. mentioned by Dr. Hayne as practicing in South Carolina, who, I fear, is not indigenous to the soil of that State. To such a medical brother typhoid fever is a Godsend. He will have ten cases where we have one. If the fever lasts only three hours it is typhoid and he cures it. You men who make examinations for insurance companies well know how many aunts and sisters and cousins and grandfathers have died of typhoid fever. Like charity, this diagnosis covers a multitude of ills. In city or country a bad case of fever is sure to be called typhoid; and perhaps, in common with Satan, this disease is not as black as it is painted.

Drainage and sanitation are all right; indeed, Col. Goethals and Dr. Gorgas have taught the civilized world the brightest lesson of this century in their solution of the Panama problem. Dr. Treves, physician to the English king, himself admits that England should take the lesson well to heart and apply it to plague-stricken India. And we may some day be able to clean up our own cities as thoroughly, may have the power to insure pure water and streets as clean as those of old Colon; then we will note the disappearance of many of the foes we doctors have now to fight.

You have heard the German folk-tale of the pied piper of Hamelin; how when the city fathers were too stingy to pay him for ridding the town of rats he played his pipe so sweetly that all the children forsook their play and followed him up the mountain side and the hill opened to receive them. Now this wise old man knew that rats carry the germs of disease, so he could safely predict the epidemic of diphtheria and typhoid due to the poisoned rats.

Modern research is abundantly proving the truth of the old fable, and if our city officials will not afford the price of civic cleanliness, we, with the people of old Hamelin, must pay the price in health and well-being of our people.

Dr. R. L. Wilson, Charleston, S. C.—I think that we all have cause to be congratulated upon the brilliant and practical papers and discussions that we have had on this subject this morning. Now, to go back over a few points, I would refer first to the specific bacillus. The first thing to have in mind in the prevention of typhoid is, where is discharged this specific bacillus of the disease? We know that in great measure this occurs in the feces and the urine. In that way contamination may find its way to others. These bacilli may find their way into shallow wells or reservoirs or other supplies of city water. We know that, through the agency of flies, as has been brought out, these bacilli may find their way to food and into milk, and there are a great many other ways in which they may come back to us and communicate the disease anew in the cities. In a general way it may be said that if we protect the water supply and the food against contamination by flies, or by other means, we have in a large measure taken the proper steps to protect ourselves against typhoid fever. In a great many of the cities examination of the source of the water and protection of the water in the reservoirs is being undertaken. The connection of all closets with the sewers and the proper care of the water supply and disposal of the sewage should give us adequate, or to a great extent adequate, protection against typhoid fever. In the rural communities we do not have this large water supply. The water supply is not one certain thing. We may have to look after the protection of shallow wells or surface water. There is no better way to protect the water supply in the country and to protect the people in every other way than by a sanitary privy, taking care of the excrement and seeing that it does not contaminate the soil, that the bacilli do not get into the wells and that the excrement does not get carried into the houses by flies. Sanitary privies guard against pollution of water and pollution of food by flies.

Dr. Goldberger brought up a very interesting feature and that is the efficient administration of health work. We know that we have plenty of information regarding the means of dissemination of typhoid fever. All that we need is, as he says, efficient administration, not only in the cities, but also throughout the country districts.

The city health officers are not sufficient to give proper health administration. We need, also, county health officers everywhere and district health officers, inspectors, and so on, in the different districts of the county, to see not only that the people get the information, but also that proper sanitary regulations are carried out. To send out circulars without seeing that the inspection is made is not sufficient or adequate. We shall not have anything like efficient protection against typhoid fever until we have this thorough administration of health matters in the country.

With regard to the contamination of the water supply, I would say that it is, of course, true that pipes in the cities may be contaminated. I am not an engineer, but it does seem to me that if there is a leak in the pipes in the city, there is an opportunity for sewage to get in—say a leak in the water main with sewage contamination about the pipe. When the water is turned off while the leak is being repaired the pressure is lowered. You do not then have one hundred pounds pressure. You may even have a negative pressure, giving a chance for the sewage to enter the water pipe. Of course, that is only temporary.

Dr. D. S. Black, Columbia, S. C.—Mr. Chairman, we hear a good deal of the contamination of food from flies, and I want to throw out a suggestion that I should like to have investigated. That is, the contamination of vegetables. Truck growers have a habit of gathering their vegetables in the evening, sprinkling them with water to keep them fresh, and putting them into a wagon, to be carried to the city the next day; and my suggestion is to investigate the source of the water that they use to sprinkle the vegetables with. The dairies are inspected for contamination, but when it comes to the truck grower, this has never, so far as I know, been investigated.

Dr. C. E. Terry, closing the discussion.—There was a remark made by someone that the fly season in the South is earlier than it is in the North. (Dr. Bassett.) There is a curious problem concerning the fly season in the South that I have not been able to solve. It has been taught us that the cold weather terminates the fly season, and in the North that appears to be the case. The typhoid fever in the North comes to an end at the termination of the fly season; but in the South we have no weather that is cold enough to terminate the fly season. In Jacksonville the fly season, according to the weather, should be twelve months long, but it is not. It begins on the first of March, or at about that date, and ends the first of July. We have four months of hot weather after the close of the fly season. Whether the fly has a life-cycle that is terminated by other agencies than cold or not I do not know, but it is not cold that terminates the fly season in the South.

Replying to the remarks of Dr. Hayne as to the physician carrying typhoid infection, I would say that I agree with him heartily. I should also like to state that the average family physician does not educate the family of the patient when he attends a case of typhoid. I do not think that it could be better expressed than in the words of Dr. Levy, that "the case of typhoid fever now in your home is the result of someone's carelessness. Do not let your carelessness cause the illness or maybe the death of others." The use of screens is an example of locking the stable door after the horse is stolen. An agent for a screen manufacturer came to me a year ago and asked me to start a movement for the passage of an ordinance requiring all the homes in Jacksonville to be screened. It was not difficult to trace the father of this thought, and I asked: "Why should we pass any such bill?" He replied: "The people are dying of malaria and typhoid. You have mosquito and fly-borne diseases here, and the use of screens will protect the public health." I did not regard him as a philanthropist, and I stated that the time would come and was not far distant when there would be no mosquitoes or flies in Jacksonville. I think that, except during the last month, we have got rid of mosquitoes in Jacksonville already. The malaria death rate has dropped almost in proportion to the drop in the typhoid death rate. The fly alone is not dangerous; it is the excrement-bred fly that we must guard against. We do not have to screen the dining rooms and kitchens if we screen our privies.

I neglected, while reading my paper, to show you this chart, which I wished to show you. It gives the curve of typhoid fever before and after the screening of the privies here. On the chart the black line shows the typhoid curve for 1910. The ordinance requiring the screening of privies was passed in August of that year, and for 1911 we have this dotted-line curve, showing the marked reduction in the number of cases of typhoid after the screening of the privies.

Dr. A. W. Freeman, Richmond, Va., closing.—I just want to say a few words in closing this discussion, which has been most interesting. First, as to the question of air transmission of disease of all kinds, and particularly typhoid fever. If we examine the history of sanitary science, the further we go back the more diseases we find regarded as air-borne. Just in proportion as our knowledge has advanced we have abandoned the air-transmission theory of disease. We have come to regard disease as a very material thing—not an impalpable or gaseous thing, but a solid thing.

Dr. A. E. Campbell, Chicago, Ill.—What about smallpox?

Dr. Freeman.—I do not believe in the air transmission of smallpox. I have had some little experience with it, too.

As regards fly transmission, as Dr. Terry has pointed out, I do not know whether he thinks the fly season is ended here or not, but there is a very marked discrepancy between the fly-curve and the typhoid-curve. The fly-curve reaches its maximum earlier than the typhoid-curve, and declines much more slowly. The curves cross each other. Careful work was done in Washington on that point, and it failed to show any correspondence between these two curves. In the South we have our flies earlier than in the North, and our typhoid earlier, but we also have our flies later than in the North, and our typhoid falls off earlier than in the North. We are almost over our worst typhoid season in the South before it gets well started in the North.

As to the contamination of water mains from sewers, I think that in all probability it is a very rare occurrence. In one instance, in Lexington, Va., investigated by Messer and myself, and re-

ported in the "Engineering News," we found important evidence of such an occurrence. The ground of the city was very rugged and hilly, and the water standpipe was on top of the hill with the main running in an easy curve down to the lower part of the town. It was the exceptionally dry summer of 1911, and in November the supply became short. The town authorities adopted the expedient of turning off a valve in the principal main on the slope of the hill. The pipe lay in the same trench with the sewer, and after the valve had been cut off the people in the lower part of the town could for some time draw water that still remained in the pipes. There was apparently a negative pressure in the pipe, due to the pull from the lower levels. It worked out beautifully from the engineering standpoint, and is the only example of such an occurrence that I have seen. I should not expect it to be possible in the level country at Jacksonville.

In conclusion, I wish to say that the question of typhoid prevention is now simply one as to whether the people want it or not. Typhoid prevention is in stock, and is for sale. We have a considerable amount of it that we are willing to dispose of at a reasonable rate, and if the people want to buy typhoid protection, they can have it any day and will get what they pay for.

VACCINE THERAPY.*

By I. E. Colgin, Ph.C., M.D.,
Waco, Texas.

As a result of the work of Wright and Douglas in 1903 we have (in bacterial vaccine) a new and useful addition to our therapeutic armamentarium. Wright's opsonic theory was a stepping stone for treatment of bacterial infections by injection of killed pure cultures of the offending germ standardized and suspended in normal salt solution. Active immunity can be conferred by this method and is superior in a great many cases to the passive immunity conferred by the use of serums. The most scientific method of using the vaccines is by taking the opsonic index as advocated by Wright, but the general practitioner has not the means nor time in which to take the index of all cases. On the other hand, vaccines can be given by a good clinical observer and equally good results be obtained.

During the past ten years every disease of bacterial origin as well as numerous ones of doubtful etiology, have been treated by specific vaccines. Needless to say, poor results have been obtained in a great many instances, due chiefly to the fact that the obtaining of the causative factor of a disease is the basal principle of vaccine therapy, and in a great many instances vaccines were used and are still being used on diseases that have never been proven to be due to bacterial origin, viz., Neoforman's vaccine for cancer.

The best authorities contend that the greatest field for vaccine treatment is in the chronic and sub-acute type of cases. Next in the acute localized infections as cystitis, and lastly in acute general infections, as septicemia, in which, in my opinion, vaccine should not be used, leaving this class of cases to be treated by serums. Vaccines should not be used in acute infections which normally have a tendency to run their course in a few days; nature in these affections is using all her resources to establish her own immunity, and the negative phase which results may turn the tide in the wrong direction, and your patient never respond enough to receive the benefit of the active process. On the other hand, if the diseases were of a chronic or sub-acute type vaccine can be given, running the risk of causing temporary harm in order to produce ultimate good.

"We must constantly keep in mind that when we use vaccine therapy we are not furnishing the patient protective substances, but merely stimuli to elaborate these substances, and the result of these elaborations is always conditional upon the right choice, right dosage and interspacing of vaccine, and also, on the other hand, on the ability of the patient to produce immunizing substance.

"Again we must not forget that the protective substances which are elaborated in response to the inoculation of a vaccine disappear rapidly from the blood. From this it can be seen that in case we do not eliminate infections immediately, and this can be hoped for only in incipient stages, that a period of longer or shorter duration of repeated vaccination must ensue, for as long as there is a residue of infection, or the channel of infection is left unguarded, with bacterial infections, recrudescence and fresh infections must be expected.

Lastly, we must realize that what can be directly achieved by vaccine therapy is nothing more than a greater protective power in the circulating blood and that where an area of infection is cut off from the general circulation all the amount of elaboration we may possibly hope to get will not give curative response until the wall between the general circulation and the part is broken down."

Autogenous vaccines give better results than stock, although in a great many cases vaccines are equally as efficient. I often use stock vaccines prepared by one biological house, and if I do not obtain results, try that prepared by another in

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hope that it will contain the strain similar to the one with which the patient is affected.

It is the custom of biological houses to incorporate numerous vaccines under the head of mixed bacterins, a regular shotgun dose, in the hopes that some shot might take effect. This is a mistake, as it is impossible for the body to establish lines of defense against several organisms at the same time. Locate the principal causative factor, even if it takes a dozen examinations, then give that particular vaccine and beautiful results will be your reward. But try to stimulate the body cells against several germs at one time and you will find that you will fail all along the line, as the reaction will be severe and the resulting immunity will be very little, if any.

Due care should be exercised that anaphylaxis does not result from the use of bacterial vaccines. Do not start a patient on vaccine treatment and fall short of the desired reaction. Vaccines should not be given too frequently. Wright pointed out that reactions occurred from three to ten days and we should wait until the reaction has fully passed before giving the second dose. Always start with a small dose, so that you can study the particular case in hand and judge the susceptibility of your patient.

The first pathological process for which a vaccine was recommended as a therapeutic measure was tuberculosis. Koch, in 1890, published premature results obtained with tuberculin, raising great enthusiasm for a time, but causing so much harm that it almost gave vaccines a death blow. Incompetent men gave tuberculin in enormous doses, paying no attention to the reactions, great harm necessarily resulting. Today tuberculin in very smal doses, careful observations of reactions by competent men, is giving results even better than Koch expected. We cannot tell how much good to attribute to tuberculin, as it is always used in connection with hygienic and dietetic measures, but it is a proven fact that those cases in which tuberculin is used show fewer relapses than the cases treated without. As a matter of fact, tuberculin should not be given unless there is a means at hand to make agglutinin or precipitin tests, as in this manner the best results are obtained. But a great many men are obtaining good results by carefully observing clinical symptoms alone. Tuberculin treatment should be confined to latent and sub-acute non-febrile cases; in cases running temperature the mixed infection should be gotten rid of by the proper vaccine methods, then tuberculin treatment can be instituted.

The most uniform results obtained from the use of vaccine are in cases of pyogenic infection, especially those caused by staphylococci such as furunculosis and carbuncles. This is due to two factors, the chronicity of the infection and the uniformity of the causative organism. Here is where the stock vaccine gives uniformly good results. Begin with an initial dose of from fifty to one hundred million mixed staphylococcus, albus, aureus and citreus and increase the dose every third to tenth day.

Success has also been the rule in treating cases of acne vulgaris. A combined vaccine of staphylococci and bacillus acne of Gilcrest is used based on the theory that the original nodule is due to bacillus acne and the pustule to secondary infection of staphylococci. Give fifty million staphylo and ten million bacillus acne as the initial dose. Give increasing doses at intervals of from a week to ten days. Warn your patient that she (usually it is a woman, but most men are just as vain about their faces) will have a new crop of pustules and nodules result immediately. This is due to the negative phase of the vaccine and will pass as soon as two or three doses have been given. Usually ten injections, supplemented by the usual sulphur lotions, will complete a cure. Advise your patient, though, that she should receive several injections about two months later so as to prevent a recurrence.

Infections of the lungs, nasal passages and ears give the next best results. Especially is this true in cases resulting from la grippe, which has a tendency to assume a chronic form. In these cases, especially chronic bronchitis, you have to use the mixed vaccines consisting of pneumococcus, staphylococcus and micrococcus catarrhalis. Unless you can take opsonic index and determine the lines of least resistance.

Usually chronic catarrh is due to Friendlander bacillus associated with pneumococcus, staphylococcus and other organisms. This is a broad field and usually takes a great deal of laboratory work to determine the real causative factor. Usually in these cases also we resort to a mixed bacterin, results not being so uniform, but brilliant in certain cases.

Otitis media, the most common ear affection, when acute should receive immediate attention—paracentesis. At this time obtain your swab, examine for causative factor and begin treatment with vaccine, if your cases assume a chronic or sub-acute form.

Chronic otitis media is usually due to staphylococcus or pneumococcus. The necrosed bone should be removed and vaccine treatment given to prevent those cases which, after operation, run a

course of from months to years without any permanent cure.

Gonorrhea, the largest field in which vaccines can be used, on account of its prevalence and chronicity, next demands our attention. Here again is where different opinions are expressed as to the value of vaccines. In the acute attacks vaccines are best not given, as the same rule holds good that nature is already attempting to subdue the enemy and vaccine would only be an added burden. It is in the chronic type of cases that vaccines give their best results, and in these cases results are not uniform. My opinion is that if the microscope were brought into play oftener better results would be obtained. Usually a mixed vaccine is given in hopes that a shot in the dark will hit, but more often it misses. Get your causative factor and you will be surprised at the good your vaccine will accomplish. Usually in men the uretheral discharge will contain staphylococci, diplo-bacillus or colon bacillus, usually no gonococci being present, as gonorrhea lays open a field for secondary infection and then retires to the background. On the other hand, smears expressed from the prostate will often give almost a pure culture of gonococci.

In women smears from the vagina will usually show numerous organisms with no gonococci (I have examined numerous chronic cases in women and have never been able to demonstrate gonococci in a smear taken from the vagina), but take a loop of pus from the cervix or urethra and you will obtain numerous gonococci. In this class of cases get rid of your mixed infection and then you will only have gonococci to deal with.

Typhoid vaccine has shown its efficiency as a prophylactic agent, having been thoroughly tested in the armies of Germany, England and the United States. It was the consensus of opinion of the leading men of the world that prevention of typhoid by vaccination was the greatest advancement made in the year 1911. However, it is still a mooted question as to the value of typhoid vaccine as a therapeutic agent. In long protracted cases vaccine cuts short the attack as is shown by the Widal examinations. It also lessens the tendency to relapses and is of service in preventing typhoid carriers.

In this paper I have not attempted to cover the entire field of vaccine therapy, but wished to lay stress upon those infections which have given the best responses to this mode of treatment. In order to obtain best results from vaccine the patients must be selected with care. Those types of cases in which the body is not doing its full duty in producing natural immunity being most applicable; those cases in which a temporary increase in the severity of the disease would do harm should be avoided. Small doses should be administered at first and the interval should be long enough to allow the body to recover from the constitutional reaction. The patient must be made to respond to the added stimulation, but as this procedure is to bring about increased bacterial destruction, care must be taken that too much endotoxin be not liberated, thereby doing harm through hyper-intoxication.

CONCLUSIONS.

In vaccine therapy success depends:

1. Choosing cases applicable to the use of bacterial vaccines.

2. Determining the causative factor—do not depend upon mixed vaccines, as usually, if you get rid of the main factor, nature can take care of the balance of infection.

3. Choose your dose according to individual patients, and do not follow set rules.

4. Make the interval long enough between injections to let the body respond to the stimulation.

DISCUSSION.

Dr. J. B. Elliott, Jr., New Orleans: At the meeting of this association held last year at Hattiesburg I reported several cases of typhoid fever treated by vaccines and I was rather severely criticised for doing so. Since that time I have four other cases treated in the same way by the use of typhoid vaccine, and the results have been uniformly successful so far as I can see. The cases have all terminated about the twentieth or twenty-second day, and after a third dose of vaccine we have generally had a fall of the temperature to normal. I have failed to see any harm done to any case by the use of the typhoid vaccines. We speak of the negative phase, but I have not yet seen it. I gave five hundred million the first day and repeated it every second day until I gave three or four doses. I have had only thirteen cases, but the results have been uniformly good. I make this reservation: I never give a case typhoid vaccine if the patient has been sick longer than two weeks. It is used only in the mild cases, and not in the late cases, as the power of resistance is giving out and is no longer stimulated by these vaccines.

I understand Prof. Leishmann has come to the use of typhoid vaccines in the treatment of typhoid fever. They can do no harm, so far as I have been able to see.

Dr. E. C. Thrash, Atlanta, Ga.: I have been observing the use of these vaccines for the past ten years, and I have been very much chagrinned at the profession at large treating them so indifferently. Any pharmaceutical that is put upon the market, regardless of value, or the endorsement of the profession, will be bought and prescribed empirically because the advertiser is behind it. We have been giving drugs from time immemorial, without any definite knowledge

whether they produce any effect or not. We give them with an abiding faith, and while within the last few years we have been curing diseases with vaccines and serums, the medical profession are refusing to accept them. One of the reasons is that they surround them with more or less mystery. They feel they are giving something they do not understand, something they do not study and they think the work should be left to a specialist or to a laboratory man.

We cannot name more than two or three diseases that we can really cure with drugs; but I can name a dozen that can be cured with vaccines. When I say they can be cured, I do not mean vaccines will cure every disease. Nothing is expected to cure in every instance, but if we can cure 5 per cent or 10 per cent of any specific disease we have made a long stride in our therapy, because when we rule out syphilis and malaria we can cure no diseases with drugs. There is not a single drug that will cure any disease that I know of except these two, but we do cure numbers and numbers with vaccines. I might mention among them acne, gonorrhea, tuberculosis, meningitis and typhoid fever. I know that vaccines in tuberculosis have been knocked time and again and said to be of no value at all simply because a doctor will try a few doses of it and because the patient does not get well he rushes to the conclusion that there is nothing to it. If you treat two or three or five cases and get no results, and cure the fifth case, you are curing 20 per cent of your cases, and it deserves to be followed up and studied and the technic of its administration mastered. I do not consider that there is anything more valuable in our therapeutic studies than to study the action of these vaccines and how to administer them intelligently. When we think of a specific, we think of a remedy that will cure in every instance, but there are no specifics which will do this. A specific is a remedy which acts directly upon the disease and checks the disease by acting specifically upon the poison that is producing it. That specific may ameliorate the disease, may benefit it, or cure it, or it may have no effect. There is usually a misinterpretation of the term specific. These vaccines are specific in the treatment of the respective diseases for which they have been found useful. The mistake we make is in trying them for a few days or a few weeks and then abandoning them. We have got to watch them carefully and learn how to administer them. We have got to learn how to give enough and not give too much. In the acute infections they are of no value. The cell structures are overtaxed and you cannot put them into a condition of doing better, but in the chronic conditions, where the cells have lagged and become indifferent, you can inject the attenuated organisms, and they are able to attack them successfully, and by attacking these successfully they are stimulated to attack the more virulent ones. This is why we get results in chronic conditions, and do not in acute infections.

Dr. I. E. Colgin, Waco, Texas (closing the discusion): In my paper I did not dwell on the use of vaccines as a therapeutic agent in typhoid fever. I was afraid to do that, because on a former occasion I did so and was called down very severely; hence I refrained from mentioning their use. At that time, however, I did not have the experience of Dr. Elliott with the use of vac-

General of the U. S. Army. Revised May 1, 1913.

THE PRESENT STATUS OF OUR KNOWLEDGE REGARDING THE PARASITIC AMOEBAE.*

By Charles F. Craig, M.D.
Captain Medical Corps, U. S. Army,
Washington, D. C.

Amoebic infections should interest every practitioner of medicine in the United States, and especially in the Southern States, where dysentery due to the parasitic amoebae is not infrequently encountered. During the Spanish-American War and the Philippine insurrection these infections were very prevalent among our soldiers, and thousands of them returned to this country infected with the entamoebae causing dysentery. Upon discharge, many of these men returned to civil life while still infective, and must have introduced the infection into many localities. In addition, recent researches have shown that amoebic dysentery is endemic in certain regions of the United States, particularly in the States bordering upon the Gulf of Mexico, while even in the northern and western portions of our country sporadic cases are frequently encountered. The recognition of these infections is important, for the best hope of securing results in the treatment of amoebic dysentery rests upon an early diagnosis and immediate treatment, for after the disease has once become chronic, it is very doubtful if many patients can be actually cured.

The occurrence, in a large percentage of healthy individuals, of an entamoeba resembling in its general morphology the species concerned in the production of dysentery makes it imperative that a differential diagnosis be made between infections with the harmless and the pathogenic parasites. Many patients have been treated for amoebic dysentery because of the finding in their faeces of the harmless species which has been mistaken for the one causing dysentery, and it is doubtless true that many of the wonderful cures of amoebic dysentery attributed to diverse drugs have occurred in just such infections, the diarrhoea present being due to other causes.

For this reason, and because the literature dealing with amoebae is often inaccessible to the gen-

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eral practitioner, it has occurred to me that a review of our present knowledge of these interesting and important parasites would be of service to the profession, and in this paper I shall give a summary of what is at present known regarding the classification, morphology, life cycle, and relation to disease of the parasitic amoebae of man, together with the methods of demonstrating them which I have found most useful.

Classification and Species.—Loesch[1], in 1875, was the first to describe an amoeba occurring in the faeces of a patient suffering from dysentery, which he named **Amoeba coli.** His work was followed by that of Kartulis[2], Hlava[3], Osler[4], Dock[5], and Councilman and Lafleur[6]. The latter authors published a classical monograph on amoebic dysentery, in which they recognized it as a distinct disease, and fully described the amoeba which they regarded as the etiological factor.

In 1897 Casagrandi and Barbagallo[7], after a thorough study of the amoebae occurring free in nature and those found in the intestine of man and other animals, concluded that the latter differed both in their morphology and life-cycle from the former, and established the genus **Entamoeba** for the parasitic species. They were evidently unaware of the work of Leidy[8], who, in 1879, had established the genus **Endamoeba** for parasitic amoebae, taking for a type species **Amoeba blattae,** of the cockroach. While eventually it may be decided that the spelling of Leidy must be retained, I prefer at the present time to adopt that of Casagrandi and Barbagallo, as the generic name **Entamoeba** has been accepted by almost every authority upon the subject. It may be stated, then, that all parasitic species of amoebae belong to the genus **Entamoeba,** as distisguished from the free-living species, which are placed in the genus **Amoeba.**

In addition to the genus **Entamoeba,** a single species belonging to another genus occurs as a parasite of man. This species was described by myself in 1906[9], under the name **Paramoeba hominis,** and is believed to be the cause of a form of chronic diarrhoea, resembling in its symptomatology a mild dysentery.

After the earlier work upon amoebae, many attempts were made to separate these parasites into distinct species, but it was not until the publication of Schaudinn's[10] paper that a clear distinction was drawn between two species, occurring in the intestine of man. Schaudinn found that one of these species, which he named **Entamoeba coli,** was a harmless commensal, occurring in a large proportion of healthy individuals; while the other, which he named **Entamoeba histolytica,** was the cause of a form of dysentery. I confirmed Schaudinn's work in 1905[11], and it has since been confirmed by many observers.

In 1906, Viereck[12] described what he considered a third species of entamoeba occurring in man, which he named **Entamoeba tetragena;** this species was considered the cause of a form of dysentery, but it is now generally admitted that it is identical with **Emtamoeba histolytica.**

Most authorities consider that **Entamoeba histolytica** and **Entamoeba tetragena** are identical. Thus Walker[13] considers that **tetragena** is identical with **histolytica** and does not exist as a distinct species, while Hartmann[14], Whitmore[15] and Darling[16] consider that most of the amoebae which have been described as **histolytica** were really **tetragena.** There is no doubt that Schaudinn failed to describe the typical cysts of **tetragena** in material which he examined, but as **tetragena** is identical with **histolytica** he simply failed to discover the method of reproduction by the formation of the characteristic four nucleated cysts, and misinterpreted certain degenerative changes as reproduction by "budding of spore formation." He accurately described a part of the life cycle and therefore his species name must displace that of tetragena. At the present time I believe that it is best to recognize but two species of entamoebae as parasitic in the intestine of man, **Entamoeba coli** and **Entamoeba histolytica.**

In addition to the two species of entamoebae mentionel, no less than eleven others have been described as being parasitic in man. These are: **Entamoeba kartulisi,** Doflein[17], 1901; **Entamoeba buccalis,** Prowazek[18], 1904; **Entamoeba undulans,** Castellani[19], 1905; **Entamoeba tropicalis,** Lesage[20], 1908; **Entamoeba phagocytoides,** Gauducheau[21], 1908; **Entamoeba minuta,** Elmassian[22], 1909; **Entamoeba nipponica,** Koidzumi[23], 1909; **Entamoeba williamsi,** Prowazek[24], 1911; **Entamoeba polecki,** Prowazek[25], 1912; **Entamoeba hartmanni,** Prowazek[26], 1912; and **Entamoeba butschli,** Prowazek[27], 1912.

It is generally believed that most, if not all, of these species are founded upon insufficient data and that eventually they will be found to be identical with one or the other of the two species already noted.

It may then be stated that our present knowledge is sufficient to enable us to recognize two distinct species of entamoebae as being parasitic in the intestine of man, i. e., **Entamoeba coli** and **Entamoeba histolytica.**

At the same time that our knowledge of the parasitic entamoebae of man has been developing, a number of species have been described as parasitic in the lower animals. Thus we have

Entamoeba blattae of the cockroach, described by Butschli[28]; **Entamoeba ranarum** of the frog, described by Grassi[29]; **Entamoeba muris** of the mouse, described by Grassi[30]; **Entamoeba bovis** of cattle, described by Liebertaz[31]; **Entamoeba nuttali** of the monkey, described by Castellani[32]; **Entamoeba testudinis** of the turtle, described by Hartmann[33]; and **Entamoeba pitheci** of the orang-outang, described by Prowazek[34].

The relation of these parasitic species of the lower animals to those of man has not been determined, but, from an epidemiological standpoint, the entamoebae which have been described as occurring in the cockroach and the mouse would appear to be of most interest, as human food could easily become contaminated with these species and thus furnish a means of transferring them to man. A further study of the adaptability of **Entamoeba blattae** and **Entamoeba muris** to a parasitic life in man is needed before we can be sure that these species are not capable of living in man and of producing pathological lesions. It is not beyond the range of probability that the cockroach and mouse are instrumental in transmitting entamoebic infection to man, as the species described as occurring in them are very closely allied, both morphologically and in their cycle of development, to the human entamoebae.

Technique.—The differentiation of **Entamoeba coli** and **Entamoeba histolytica** depends upon differences in morphology and in their life cycle, and both the living parasites, and properly fixed and stained preparations should be used in attempting to differentiate between them. I wish especially to call attention to the great value of the study of the living entamoebae in diagnosis and in the determination of the phenomena of reproduction, for this method of studying these parasites has been sadly neglected by most protozoologists and many of their species differentiations rest almost entirely upon the morphology of stained specimens. This has given rise to much confusion and I am satisfied has led to serious mistakes in the identification of the different species. Even with the best methods of wet-fixation and haematoxylin staining it is easy to make the nuclear structure of **Entamoeba coli** resemble that of **Entamoeba histolytica** by simply varying the amount of differentiation with the fluids used for this purpose, and while it would be impossible to render the nucleus of **Entamoeba histolytica** like that of **Entamoeba coli**, owing to the absence of the large karyosome, the opposite is true, and may account for some of the confusing reports regarding these two species of entamoeba. In the living condition these two parasites are easily distinguished and therefore this method of examination should never be neglected.

For the study of **living** entamoebae, a small portion of a freshly passed stool should be placed upon a microscopic slide and covered with a cover-glass, gentle pressure being used to spread the specimen. The material selected for examination should preferably be from the liquid portion of the stool rather than a solid particle, and, if present, particles of mucus or any blood-stained material should be examined as well. Unless the patient is having diarrhoea a saline cathartic should be administered before making the examination. For the best results the faeces should be examined immediately after they are passed, as then the entamoebae are motile and more easily recognized. If one is accustomed to studying these parasites this precaution is not necessary, for if the specimen be examined before degeneration of the entamoebae has occurred, one may as easily recognize an immotile entamoeba as a motile one. It is well to keep the specimen of faeces at about the temperature of the body if any delay occurs before the examination is made.

If the reproductive cycle is to be studied, a warm-stage or incubator for the microscope is necessary, as otherwise many of the most important reproductive phenomena will be overlooked or they will occur in an atypical manner. If the stool is partially formed, it is necessary to dilute the portion to be examined with normal salt solution, and a loopful of the mixture is then examined. One should always be careful not to use too thick a preparation, and several should be examined before a negative result is considered as of any value. In severe cases of dysentery I have more than once found a few entamoebae in the ninth or tenth preparation examined, the others being negative.

In **staining** these parasites it should be remembered that they are extremely delicate in structure, and that even our best methods undoubtedly distort them to some extent. It therefore follows that the methods which are least apt to cause erroneous appearances are those best adapted to the study of the structure of these organisms. Wet-fixed specimens, stained with one of the haematoxylin stains, give the best results, and I have found the following method—really an adaptation of Mallory's chloride of iron haematoxylin stain, first brought to my attention by Dr. W. M. James, of Panama—one of the most reliable I have used, and as it can be followed by anyone trained in laboratory work I would recommend it as an excellent routine stain for the differentiation of the parasitic entamoebae. The following

steps should be followed in staining with this method:

1. Make thin smears of faeces upon the surface of a microscope slide and immerse at once, without drying, in Schaudinn's sublimate-alcohol solution and fix for from two to five minutes.
2. Harden in 80 per cent alcohol for ten minutes.
3. Wash in 50 per cent alcohol and then in distilled water.
4. Flood the preparations with the mordant, which consists of a 10 per cent aqueous solution of chloride of iron. This should be freshly prepared.
5. Pour off the mordant and then flood the preparations with a freshly prepared solution of haematoxylin made by adding crystals of haematoxylin to 250 c.c. of distilled water, while warm, until a deep port-wine color is produced. The solution is then added to the preparations until all the haematoxylin is precipitated, which is shown by the smear appearing through the solution. Stain for from five to twenty minutes.
6. Wash the smears in at least ten changes of distilled water.
7. Decolorize with a one-half per cent solution of chloride of iron in distilled water, which must be freshly prepared.
8. Wash the smears in tap water. They may be left in this over night.
9. Dehydrate in 95 per cent and absolute alcohol.
10. Clear in xylol, or any clearing oil.
11. Mount in neutral balsam.

With this method the cytoplasm of the entamoebae stains a grayish blue, while the nuclear membrane and chromatin stains a deep black, the structure of the nucleus being beautifully shown.

Morphology and Life Cycle.—The differentiation of the various species of entamoebae is based upon differences in both the morphology and life cycle, but in a contribution like this it is impossible for one to consider in detail the morphology of the species that have been described, so that only the most important differential points will be mentioned concerning the two generally accepted species.

Entamoeba coli, in the **living** state, shows but little distinction between the ectoplasm and the endoplasm; the nucleus is always clearly distinguishable, having a thick nuclear membrane and a well-marked karyosome; the movements are sluggish; red blood corpuscles are very rarely observed within the cytoplasm; vacuoles may or may not be present, but, when present, are never contractile, and cysts are observed containing, on the average, eight daughter nuclei. In the **stained** specimen the nucleus shows a thick nuclear membrane, upon the inner side of which are scattered masses of chromatin, while there is a spherical, deeply stained karyosome, and considerable loose chromatin between it and the nuclear membrane.

Entamoeba histolytica, in the **living** condition, shows a very marked distinction between the ectoplasm and endoplasm, the former being much more refractive than the latter; the nucleus is almost always invisible, and, when visible, is observed to possess a very delicate nuclear membrane, and a very minute karyosome, at one stage of develpment, and a large karyosome at other developmental stages; vacuoles are **generally** present but are not contractile; red blood corpuscles are very often observed within the cytoplasm; the motility of this species is very marked, motion being rapid as compared with **Entamoeba coli**; cysts comparable with those of **Entamoeba coli** occur, but instead of containing eight daughter nuclei contain only four nuclei. In this species there occur two types of nuclei in the vegetative forms, one, the typical **histolytica nucleus,** having a delicate nuclear membrane, and a very minute karyosome, while the other has the typical structure of the **Tetragena nucleus,** the nuclear membrane being thicker, while there is a large karyosome generally containing a centriole. Peculiar degenerative forms occur in this species that were interpreted by Schaudinn and myself as representing multiplication by spore formation, but I now believe that these are purely degenerative in character.

The **histolytica** type of nucleus occurs in the most severe and acute cases of dysentery, while the **tetragena** type occurs in the milder and more chronic forms, and just before encystment. As encystment approaches the entamoebae become smaller, forming the so-called small generation; the nucleus may be of the **histolytica** type, but is generally of the **tetragena** type, or an intermediate type, and the organisms assume a more spherical shape. The cysts show from one to four nuclei, and often contain large, spindle-shaped masses of chromatin.

The two species of entamoeba under discussion differ greatly in their methods of reproduction. **Entamoeba coli,** during the vegetative stage, multiplies by simple division and schizogony, with the formation of eight daughter entamoebae; in the cystic stage by the formation of cysts containing eight daughter nuclei. **Entamoeba histolytica** during the vegetative stage multiplies by simple division, and in the cystic stage by the formation of cysts containing four daughter nuclei. The statement of Schaudinn that this species mul-

tiplies by spore formation has now been proven to be erroneous.

Cultivation.—It is now established that none of the parasitic amoebae have been cultivated upon artificial media. Numerous observers have claimed to have cultivated parasitic amoebae, notably Musgrave and Clegg[33], but the researches of Hartmann[36], Werner[37], Whitmore[38], Walker[39], Liston[40], Wells[41], and myself[42], have shown definitely that the amoebae that have been cultivated are common free-living species, having nothing to do with the production of dysentery in man, and differing both in morphology and life-cycle from the parasitic amoebae or entamoebae. It is comparatively easy to cultivate amoebae from the faeces of dysentery patients, but these amoebae are free-living species that have either been ingested and passed through the digestive tract in an encysted condition or have reached the material from which the cultures were made, or the culture media, through the air. Indeed, both Liston and Wells have proved that it is possible to secure cultures of amoebae by simply exposing plates containing suitable culture media to the air in India, and their experiments prove that this is the manner in which many cultures have been obtained from both faeces and liver abscess pus. At the present time it may be definitely stated that the parasitic amoebae have not been cultivated and that only free-living species have so far been obtained in this manner.

Relation to Disease.—The recent developments in our knowledge of the entamoebae necessitates a revision of some of our data connecting these organisms with disease in man, as all of the evidence gained by experiments with cultural amoebae must be discarded, as such evidence is of no value as showing the relation of parasitic amoebae to disease. In addition, the results obtained experimentally in animals by feeding or injecting material containing entamoebae must be revised in the light of the proven existence of a harmless and at least two pathogenic species.

The following theories have been held regarding the relation of entamoebae to disease in man. (1) That they are all harmless commensals; (2) that they are secondary factors in the etiology of disease; (3) that all species of amoebae are capable of causing dysentery; and (4) that both pathogenic and non-pathogenic species are parasitic in man.

Recent researches have shown that the latter theory, i. e., that pathogenic and non-pathogenic species of entamoebae are parasitic in man, is correct. It is still impossible to say whether some other factor is necessary before the pathogenic species can cause disease, but the evidence all points to the contrary opinion. At the present time it is generally accepted that certain species of entamoebae are capable of producing dysentery, but a few authorities still maintain that these parasites are only secondary invaders of the tissues and are not responsible for the lesions present. In support of this contention they point to the fact that entamoebae are found in many healthy individuals and in patients suffering from diseases other than dysentery; that dysentery occurs in epidemic and endemic form in regions where entamoebae cannot be demonstrated; that many different agents, when injected into the intestine, are capable of producing lesions like those of amoebic dysentery; that direct infection of either animals or man with entamoebae has never been proven; that the deductions based upon animal experiments are unsatisfactory, and that until we are able to cultivate the entamoebae and to produce dysentery with pure cultures, we are not justified in claiming that they are the cause of disease.

These objections, with the exception of the last mentioned, can all be answered by the results of work accomplished during the past few years. We know that the presence of entamoebae in health and in disease other than dysentery is explained by the occurrence of a distinct species which is non-pathogenic and which is a parasite of man; that the occurrence of endemic and epidemic dysentery in regions where entamoebae have not been demonstrated is due to the group of dysentery bacilli; that the lesions produced by the injection of either chemical or bacterial substances into the intestine are not identical with those produced by the entamoebae; that direct infection of animals with entamoebae has been abundantly proven, and that such experiments are reliable when properly controlled. As regards the last objection, i. e., that until pure cultures are obtained the causative relation of entamoebae to disease cannot be maintained, it may be stated that this is not a fair or valid objection, as there are other parasites well known to be the cause of specific infections which have not as yet been cultivated.

In support of the etiological relation of certain species of entamoebae to dysentery, we have the following facts: (1) The absolutely characteristic pathology of amoebic dysentery and the constant presence of the pathogenic species of entamoebae in the lesions and their absence from the lesions of other forms of dysentery; (2) the constant presence of pathogenic entamoebae in the tissues of the peculiar form of liver abscess which often complicates amoebic dysentery; (3) the produc-

tion of typical amoebic dysentery in susceptible animals by feeding and inoculation experiments with material containing the pathogenic entamoebae and the demonstration of the parasites in the lesions so produced.

It is not necessary at this time to discuss in detail the pathology of amoebic infection. It is a self-evident fact to all who have had experience with amoebic dysentery at the autopsy table that the lesions of this disease are absolutely characteristic and are entirely distinct from those of the bacillary forms of the disease. I have had the opportunity of studying hundreds of cases of both amoebic and bacillary dysentery at autopsy, and can state that one can easily distinguish the lesions produced by the entamoebae from those due to other causes.

If sections are made through the lesions in the intestine, entamoebae may be demonstrated in every portion of the involved region. They are frequently numerous in the mucous, sub-mucous and muscular coats of the intestine, where they may be demonstrated in the glandular tissue, in the intermuscular septa, and in the lymphatics and blood-vessels. Of course, in the intestine, it cannot be denied that a portion of the pathological picture may be due to bacteria which have gained entrance to the tissues along with the entamoebae, but the fact remains that the latter organisms are always associated with a characteristic ulcerative lesion never produced by bacteria alone.

It is well known that a peculiar form of liver abscess frequently complicates amoebic dysentery. The pathology of this condition is characteristic and in the contents of such abscesses entamoebae can always be demonstrated and if sections are made of the abscess wall these organisms are found within the tissues. Frequently the abscess contents are sterile save for the entamoebae, while the most careful staining of the tissues fails to reveal any other etiological factor.

I believe that if we had no other evidence than the peculiar lesions of this form of dysentery with which are always associated the pathogenic species of entamoebae, we would be justified in considering the latter as the cause of the disease.

The experimental production of dysentery in susceptible animals with material containing entamoebae dates back practically to the discovery of **Amoeba coli**, and Loesch[43], Hlava[44], Kovacs[45], Kartulis[46], Zancoral[47], Strong and Musgrave[48], and many others have recorded successful experiments in this direction. However, all of the experiments were inconclusive as regards the particular species of entamoeba concerned in the production of the lesions, and it was not until Schaudinn's work that it was definitely proven that there existed a harmless species and one that was the etiological factor in the production of dysentery. He proved that **Entamoeba coli** does not produce dysentery either in man or the lower animals, and that **Entamoeba histlytica** is capable of producing a severe and fatal form of dysentery in young cats. His experiments were soon confirmed by numerous observers, and later Hartmann[49], Viereck[50], and Werner[51] proved that **Entamoeba tetragena**, a supposed new species, but really identical with **Entamoeba histolytica**, is also capable of producing dysentery in these animals.

Entamoeba coli is a harmless species, found in a large percentage of healthy individuals and those suffering from diseases other than dysentery. Schaudinn[52] found it present in 50 per cent of healthy individuals in West Prussia; in 20 per cent in Berlin, and 66 per cent of healthy people examined on the shores of the Adriatic Sea; Vedder[53] in 50 per cent of healthy American soldiers, and 72 per cent of Filipino scouts in the Philippines; Sistrunk[54] in eleven of one hundred and forty-five patients suffering from disease other than dysentery in the Mayo Hospital at Rochester, Minn., the patients coming from different parts of the United States; and Ashburn and myself[55] in 71 per cent of healthy American soldiers in Manila. In 1905[56] I examined over two hundred American soldiers in San Francisco, and found that 65 per cent of them showed **Entamoeba coli** in the stools after a saline cathartic. These soldiers were recruited from all portions of the United States and had not been in the Philippines or other places in the tropics. This species has lately been demonstrated by Stiles[57] in North Carolina, by McCarrison[58] in India, and its occurrence in the Philippines confirmed by Whitmore[59] and Walker[60]. It has also been found upon the Isthmus of Panama by Darling[61] and James[62], in South America by Elmassian[63], and in Samoa by Prowazek[64].

That this parasite does not produce disease has been proven by numerous investigators. Negative results have been obtained from the rectal injection of cats with faecal material containing it by Kartulis[65], Kruse and Pasquale[66], Celli and Fiocca[67], Strong and Musgrave[68], Jurgens[69], Wellman[70], and many others. I[71] was never able to produce the least symptom of dysentery by either feeding or the rectal injection of material containing this species in cats, although 50 per cent of the kittens given rectal injections of faeces containing **Entamoeba histolytica** and 75 per cent of those fed

with material containing the latter organism developed typical amoebic dysentery.

Entamoeba histolytica was first proven to be a pathogenic species by Schaudinn and his work has been confirmed by subsequent investigators. In my own work upon this subject[72] I found that half-grown cats developed typical amoebic dysentery after either the rectal injection or feeding of material containing this species, but the best results were obtained by feeding the infected material. The lesions produced were typical of those occurring in amoebic dysentery as observed in man (in some animals even amoebic abscess of the liver was produced), and a fatal issue was not uncommon.

These observations were confirmed by Werner[73] and Wellman[74], and the evidence is sufficient to prove that **Entamoeba histolytica** is the cause of a form of amoebic dysentery. The character of the lesions produced in the animals, the constant association of this species with the lesions and the production of liver abscess containing the entamoeba I consider conclusive proof that this parasite is a cause of amoebic dysentery.

Entamoeba tetragena, the supposed new species, really **Entamoeba histolytica**, has been proven to be capable of causing dysentery in cats by Viereck[75], Hartmann[76], Werner[77], Fantham[78], and Darling[79]; the lesions produced are similar to those produced by feeding or injecting **Entamoeba histolytica**, as would be expected since they are identical. Wenyon has also produced dysentery and liver abscess in cats with this species.

Franchini[80] has recently shown that **Entamoeba tetragena** also produces a form of dysentery in the monkey, indistinguishable both clinically and pathologically from that observed in man.

It is necessary to consider briefly the claims of some authorities who have thought that they were able to produce dysentery in animals with cultures of amoebae. As I have already stated, it has been definitely determined that all of the cultural amoebae that have been thoroughly studied are free-living species bearing no relation to dysentery, and differing both in morphology and life-cycle from the entamoebae causing disease in man or the lower animals. However, numerous investigators, notably Musgrave and Clegg[81], claim to have produced lesions of dysentery in animals with these amoebae, and it is therefore of importance to show wherein their claims are unwarranted. Musgrave and Clegg were able to cultivate amoebae from the faeces of dysenteric patients with pure cultures of several bacteria, and with these mixed cultures produced lesions in animals. That these lesions were due to the cultivated amoebae thus introduced cannot be accepted, for it has been proven that the amoebae experimented with are not pathogenic to animals. I studied one of the amoebae which they claim produced lesions and found it to be a typical free-living species, and feeding cultures of the organism to half-grown cats did not result in the appearance of either symptoms or lesions of dysentery, according to several investigators who have endeavored to confirm their results. Musgrave and Clegg, in their experiments, injected mixed cultures of amoebae and bacteria (often such organisms as the typhoid bacillus and the spirillum of cholera) directly into the liver, the subcutaneous tissue, or the peritoneal cavity, and such injections were frequently followed by abscesses containing both amoebae and bacteria and sometimes evidences of a systemic infection. I do not believe that these experiments are of any value as showing the relation of the parasitic amoebae to disease, or as showing that the cultivated amoebae were really parasitic, for even though they might have been capable, when acting alone, of producing the lesions observed, which is more than doubtful, it would not prove that they were identical with the entamoebae found in man, for, as has been shown, these cultivated amoebae all differ markedly in their morphology and life-cycle from the entamoebae.

Musgrave's and Clegg's claim that the differences in the structure and life cycle of the cultivated amoebae are due to artificial conditions, such as are present in the cultures, has not been proven. Walker, in discussing this argument, very justly says "that while slight modifications might occur under such conditions, it is very improbable that cultivation could cause a complete reorganization of the structure of the nucleus, develop **de novo** such a constant organelle as a contractile vacuole, or profoundly modify the life-cycle of the organism. Moreover, that the supposed modification should invariably take the form of a change from the characters of the genus **Entamoeba** to those of the genus **Amoeba** is, to say the least, improbable."

Most of Musgrave and Clegg's experiments were conducted upon monkeys, and it is well known that these animals suffer frequently from naturally acquired dysentery, and already two species of entamoebae have been described as parasitic in them. Greig and Wells[82] have shown that in India natural amoebic infection is very common in monkeys, every one of fifty-three animals with which they desired to experiment showing entamoebae in their faeces which resembled those found in man. The organisms only appeared at irregular intervals, so that repeated examina-

tions of the stools were required in order to demonstrate them; some of the monkeys developed symptoms of dysentery while under observation, while others remained apparently healthy. I cannot state the percentage of monkeys infected with entamoebae in the Philippines, where Musgrave and Clegg's work was done, but I personally observed three naturally acquired amoebic infections in these animals in Manila, and I have no doubt that careful examinations, covering a sufficient period of time, would show that a considerable percentage of these animals are infected. It therefore follows that unless repeated examinations, covering several weeks, are made of the stools of monkeys no dependence can be placed upon the apparent results of experiments with amoebae or entamoebae.

However, it may be stated positively that the morphology and life-cycle of the cultivated amoebae differ so radically from that of the parasitic amoebae that it is difficult to understand how anyone possessing accurate knowledge of this class of organisms could mistake the cultural species for those parasitic in either man or the lower animals.

Conclusion.—In this brief summary of our knowledge regarding the parasitic amoebae it has been impossible to touch upon any but the most important facts that have been ascertained from the study of these interesting organisms, but it may serve to indicate how much we have learned within recent years and stimulate further research. We are still very ignorant regarding the exact method of the transmission of these parasites from host to host, and we know nothing whatever about the relation the species found in the lower animals bear to those found in man, so that researches along these lines may result in valuable knowledge regarding the epidemiology of amoebic dysentery. The point of greatest practical importance to the physician is the demonstration of harmless entamoebae in so large a proportion of healthy persons, and those suffering from diseases other than dysentery, and the vital necessity of differentiating between this species and that causing disease, before making a diagnosis of amoebic dysentery in patients who do not present typical clinical symptoms of the disease. I would therefore urge the greater use of the microscope in the diagnosis of diseases of the intestinal tract, especially in regions where amoebic dysentery and other parasitic infections of the intestines are endemic, believing that this one measure will be of more service in arriving at a correct diagnosis than any other at our command. The patients showing cysts of **Entamoeba histolytica** are the only ones that are dangerous, as it has been proven that only the cysts are infective, the vegetative forms being inocuous to experimental animals.

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DIAGNOSIS AND TREATMENT OF AMEBIC DYSENTERY.*

By E. M. Mason, M.D.,
Birmingham, Ala.

When Osler, in 1890, reported the first case of amebic dysentery for America but little interest and no enthusiasm was aroused. The infection

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had occurred in Panama and no one supposed that amebiasis would ever prove of importance in the temperate zones. Time has changed this view, case reports having come from as far north as Canada, and from nearly every State in the Union. Indeed, so widespread is the infection that some recent writers express the opinion that amebiasis is second in importance only to hookworm disease. This extreme view I am not prepared to accept, but it is undoubtedly true that the disease is widely disseminated throughout the country; to a much greater extent, in fact, than is generally supposed to be the case. Of great interest, also, is the fact that in many localities the non-pathogenic entameba coli abounds and must be recognized in order to avoid the grave error in diagnosis and prognosis that would follow were it mistaken for a pathogenic species.

Diagnosis.—When in a patient suffering from chronic diarrhoea or diarrhoea alternating with periods of constipation, we are led to suspect amebic infection; two questions present themselves for consideration. First, are amebae present? Second, if so, to what species do they belong? The answer to these questions lies in that **bete noir** of many clinicians, thorough examination of the feces.

Here the distant laboratory can be of no assistance to us. Rarely, and in warm weather, one finds motile amebae in a stool two or three hours old, but all motility ceases at a temperature but little below that of the body, hence our examinations must be made on a freshly passed stool which has not been allowed to become cold.

However sure experts may be of their ability to diagnose amebae in the encysted stage, it is not safe for the average clinician or laboratory worker to call any body ameba, however typical he may think it to be, unless he actually sees it in characteristic ameboid activity. It is an excellent plan to give a saline cathartic before collecting the specimen for examination, in order that the intestines may be well flushed out and the amebae washed away from the floors of the ulcers. One then collects the semi-fluid stools preceding the more liquid actions. Much depends on the portion of the stool selected for examination under the microscope. If mucus, which is frequently blood-tinged, be present, a bit of it is taken; otherwise, the more liquid part rather than the solid material should be chosen. If the weather be cool the slide should be quickly prepared and should be kept warm during the examination.

More often than not flagellates—cercomonads and trichomonads—are found in symbiosis with amebae, hence the presence of these actively motile little bodies will often arrest our attention when first focussing on the preparation. Further examination may reveal the presence of motile amebae which we can then proceed to study for classification. Negative findings are by no means conclusive, however. Many times I have failed to find amebae on feces examination, only to discover them in great abundance when the rectal tube was brought into service. Only recently a patient was seen whose stools had been repeatedly examined by several men with negative results. On introducing the rectal tube, a bit of mucus was obtained which was teeming with amebae. In fact, feces examinations are so often negative and rectal tube examinations so uniformly satisfactory that in our work the latter method has almost entirely replaced the former. The tube may be passed in the office, if necessary, and one seldom fails to find a mass of amebae-laden mucus either in the tube contents, or scraped off by and adherent to one of the windows in the side of the tube. If the tube and contents must be transported from the home to the laboratory for examination, the necessary temperature may be maintained by placing the tube and contents in a warm vacuum bottle, or in a jar which is kept warm by being immersed in a larger jar filled with warm water.

Something like a dozen species of amebae have been described as parasitic in the intestines of man. No doubt several of these are the same species under different names. According to present knowledge, only three of them are of importance to us in this country. These are: Entameba coli, entameba histolytica and entameba tetragena. The last named species is rare outside of the tropics, but one should be on the lookout for it. Entameba histolytica is the common pathogenic ameba, while entameba coli is a harmless commensal which is of importance only because it may be mistaken for the pathogenic species. Throughout the tropics the entameba coli seems to be a normal inhabitant of the intestinal tract in a large proportion of the inhabitants. Craig found it in the feces of 71 per cent of 107 healthy soldiers in the Philippines, his results being confirmed by Vedder, who found it in 75 per cent of fifty healthy Filipino scouts whose feces he examined. Stiles, Craig and some other authorities hold that entameba coli is almost equally prevalent in this country, a belief which I cannot accept for Maryland and Alabama, the States in which my work has been done. Dock in Michigan and Simon in Louisiana were also unable to find entameba coli in more than a small per cent of the stools examined from normal per-

sons. However, there are numerous localities where infection with entameba coli does occur, either alone or associated with the pathogenic species, hence we must be on the alert to differentiate it from the other types.

For detailed descriptions of these parasites, reference may be had to the original communication of Schaudinn as regards entameba histolytica and entameba coli, or to the excellent monograph of Craig, where all the types are described. I shall only enumerate the chief differential points here.

Entameba coli averages from two to three times the size of a red blood corpuscle. The distinction between ectoplasm and endoplasm is never marked and often is made out with great difficulty. The nucleus is prominent, centrally located and has a definite nuclear membrane. Vacuoles are rare and poorly defined.

Pseudopodia are short and blunt, and the movements of the parasite are usually quite sluggish. Contained bodies, including red blood cells, are infrequent.

Entameba histolytica averages somewhat larger than entameba coli, being from three to six times the diameter of the red blood cell. The ectoplasm is strikingly differentiated from the endoplasm, the sharply outlined, clear, glassy ectoplasm being one of the chief earmarks of this organism. Craig speaks of a peculiar greenish color, due to pigment from the contained blood cells, as characteristic of this parasite. Entameba histolytica seldom shows a nucleus; when one is present it is poorly defined and excentrically placed. One or more well-marked vacuoles are to be seen in the ameba of average size. Significant also is the fact that in this species red blood cells are frequently contained in the body of the parasite, often a dozen or more being seen in one ameba. Pseudopodia are more finger-like than in entameba coli and are always formed by the clear ectoplasm, the endoplasm flowing in after the pseudopod is well formed. In fresh specimens motility is very active.

Entameba tetragena is not thought to be a common parasite in this country, but a number of cases have been reported. In size it shows no distinction from the forms already described. Ectoplasm and endoplasm are clear and distinct, while a large, well-defined nucleus is constantly present. Vacuoles may or may not be present. Motility is active, the pseudopodia being formed primarily by the clear ectoplasm.

Ordinarily anyone who has had a fair amount of experience in amebic work can readily classify the organisms found. In doubtful cases recourse must be had to the staining reactions and methods of reproduction of the parasites. This entails a considerable amount of time and work, but fortunately one seldom has to proceed so far for diagnosis alone.

The staining reactions are not specific, but when properly stained with Hasting's or Wright's stain, entameba coli shows the deeper stain in the endoplasm, entameba histolytica in the ectoplasm, while entameba tetragena is said to take the stain practically uniformly throughout.

For study of the reproductive process one must have a warm stage, or, better still, a warm box for the microscope, and follow the development of the parasite through many hours.

Aside from the process of simple division, which is common to all, each species has a definite and characteristic method of reproduction by schizogony by means of which the parasite reproduces under unfavorable conditions.

Entameba coli undergoes encystment and forms eight daughter amebae within the cyst, entameba histolytica by the formation of spores which are extruded by budding from the periphery of the parent organism, while entameba tetragena reproduces like entameba coli by the formation of daughter amebae within a cyst, but with the difference that only four daughter amebae are formed.

Treatment.—Amebic infection occurs sometimes through infected water; fruits and green vegetables are often at fault and contact infection, either direct or indirect, very likely plays an important part in the dissemination of the disease. Proper control of these avenues of infection would mean the eradication of the disease.

For the individual patient, rest in bed for at least two weeks is essential to the first step in treatment. The diet should be confined to liquids at first, with the gradual addition of light solids as the patient improves. Should the patient apply for treatment during the stage of acute diarrhoea, it is preferable not to institute specific treatment until the urgent symptoms have been controlled by means of rest in bed, proper diet, simple colonic lavage and, perhaps, the use of opium and bismuth. Should there be constipation, saline cathartics should be used freely until the bowel is thoroughly cleansed.

Until quite recently colonic irrigation with germicidal solutions was the mainstay in specific treatment, nearly all of the well-known antiseptics having been used at one time or another, quinine, silver nitrate and mercuric chloride being the favorites. Of these, quinine was most commonly

employed. Starting with a solution of 1 to 1,500, the strength was gradually increased until a 2 to 3 litre irrigation of 1 to 500 strength was used twice daily, the patient changing from knee-chest to right lateral position and retaining the solution for fifteen to twenty minutes. Under this plan of treatment some undoubted cures resulted, but a number of objections arose. Not all patients can retain a two-quart enema for fifteen minutes. The physician must himself, in the majority of instances, give the enema, since proper introduction of the rectal tube cannot be left to the ordinary hospital orderly. Cinchonism rapidly supervenes in many patients and in others the inflamed condition of the bowel makes a continuation of the treatment impossible. Finally, the treatment is tedious and not always successful, for when deep-seated, undermined ulcers are present the fluid does not reach the amebae at the bottom of the ulcers. Some writers have even asserted that the beneficial effects of this plan of treatment were due to the systematic colonic lavage rather than to the quinine. Be that as it may, it is certainly true that irrigation with cold water or plain salt solution has resulted in marked improvement in many instances.

Of all the remedies proposed, ipecac has, in my experience, given the most prompt and satisfactory results. Its action seems to be truly specific, and it is not uncommon to note the entire disappearance of amebae from the stools after only one dose of the drug. The nausea and vomiting that follow the improper administration of ipecac have caused it to be looked upon with disfavor by many physicians, yet these untoward effects may be easily averted by proper preparation of the patient and of the drug.

Before beginning ipecac treatment the patient should be placed on a liquid diet and the bowels should be thoroughly flushed by means of a saline cathartic. For three hours before giving the drug the patient should receive no nourishment. The ipecac should be of proved potency and should be administered in the form of freshly prepared salol-coated pills or capsules. Much of the trouble that has arisen from the use of ipecac has been due to the use of improperly coated pills, or pills that were so old and hard that they passed through the intestines without being dissolved. For some time it has been my custom to use the powdered drug in the form of salol-coated five-grain capsules instead of pills, each lot of capsules being freshly prepared by a competent pharmacist at the time when needed. The object of the salol coating being merely to protect the capsule during its passage through the stomach, the salol covering should only be of sufficient thickness to serve this purpose. The amount of salol used is perfectly harmless. The proper dose may be given at intervals during the day, or, preferably, in one large dose at bedtime. The usual custom is to give on an empty stomach at bedtime from sixty to eighty grains of ipecac with as small a quantity of water as possible, the patient being directed to lie on the right side for an hour after swallowing the capsules. In nervous or apprehensive patients it may be desirable to give a small dose of opium. Given in this way, ipecac but rarely causes nausea or discomfort, the patient passing a comfortable night. The same dose is repeated nightly for three or four nights, then, if the stools be free of amebae, the nightly dose is decreased gradually until ten grains only are given. This dose is continued for from one to two weeks. At the end of this time silver nitrate irrigations may be used if rectal ulceration is pronounced.

Under this plan of treatment patients are frequently enabled to return to work at the end of two or three weeks, but they should be cautioned to be on the lookout for a return of symptoms, since the well-known tendency to recurrence may make a second course of treatment necessary.

Another virtue claimed for ipecac is that it lessens the likelihood of liver infection, with the formation of abscess, which occurs in something like 20 per cent of untreated or imperfectly treated patients. Since using the ipecac treatment I have never seen a case of amebic abscess of the liver.

In conclusion, a word may be said with reference to the surgical treatment of amebiasis by means of appendicostomy and irrigation through the caecum. I do not feel that operative treatment is justifiable in the ordinary case, though there may be a field for it in the occasional chronic and intractable case that fails to respond to the usual form of treatment. In the two cases in which I have seen surgical intervention resorted to the results were far from satisfactory. Should an operation be done, the caecum rather than the appendix should be opened.

Summary and Conclusions.—Amebic dysentery is not confined to the tropics, but may be encountered in any part of the United States and even in Canada.

Outside of the tropics infection with entameba coli is probably not so common as has been supposed. The rectal tube is an indispensable adjunct to technique in diagnosis, and the finding of definitely motile amebae is the first step in diagnosis. Careful study of the fresh specimen

will enable one to differentiate the amebae in practically every case. Proper classification of the parasites found must always be made, otherwise the diagnosis of amebic dysentery may be erroneously based on the presence of harmless entameba coli.

The ipecac treatment of amebic dysentery is practically specific.

DISCUSSION.

Dr. Sidney K. Simon, New Orleans—I think we are to be congratulated on having been able to listen to such instructive and comprehensive papers on this subject. Dr. Craig's work in this field has been that of a master mind, so to speak, and to those of you who have not yet read his work on the parasitic amebae of man, I would advise you to do so, provided you are sufficiently interested in the subject, and I think all Southern physicians should be sufficiently interested in this subject to read that work, which, to me, reads almost like a novel.

The point Dr. Craig brought up in regard to the mode of transmission by the roach or the mouse is certainly a new point and a very interesting one. I had always believed in a sort of theoretical way, without practical demonstration, that the banana was largely accountable for the distribution of amebic infection in this country. As you know, the bananas are imported from the Central American countries in large numbers, shipped through the Southern ports of the United States, and shipped to all sections of this country in cars without, in many instances, having touched the hands of any of the American dock laborers, and so forth. Since we know that the amebae grow rapidly or readily on the over-ripe banana, it struck me as a possible means of transmission from the South American countries that the banana might be a source of infection. I was particularly struck by that the summer before last, when in Rochester, Minn., when I learned that they had discovered forty cases of amebic dysentery originating in that city. Minnesota has one of the most frigid climates in the United States in winter. It is certainly not a sub-tropical climate, and still the doctor who gave me the information was able to prove conclusively that these forty cases had never been out of the Northwest, and in many instances not out of Rochester, Minn., showing the widespread distribution of this infection not only in this country, but in all northern climates, and how little justice there is in claiming that amebic dysentery is distinctly a tropical disease.

The fact that amebae can be transmitted by roaches and mice is very interesting, and I shall keep it in mind. The differentiation between the different forms of amebae is a very serious problem to the general practitioner. We have had some difficulty among our students at home in teaching them to find amebae, in teaching them to look for amebae and find them. Now we have, according to our present knowledge, not only to instruct the practitioner of medicine to examine the stools, which is a somewhat difficult thing to do, because somehow or other the examination of the stools is considered beneath the dignity of the majority of doctors, and they do not seem to realize the very great importance of examination of the stools, especially in the South, but now we have to teach them not only to examine the stools, but that not every ameba they find in the stools is a pathogenic ameba; that some of the amebae they see do not cause disease. What Dr. Craig has said is true, that it is not such a very easy matter, even for the experienced always to differentiate entameba coli from the ameba histolytica or tetragena. I believe for the average practitioner, who has not a great deal of time to delve into these matters of differentiation, the various staining methods, such as Dr. Craig has worked out so beautifully, a very good practical point for him to remember is this: If you find an ameba in the stool which moves and which contains red blood vessels or cells, you are perfectly safe in saying this is a harmful ameba, and not the harmless variety, and you will not go astray if you consider that case of movable ameba containing red cells as true ameba histolytica, and that, therefore, it is a case for treatment.

As to the distribution of the entameba coli, I have been interested in it for several years, and I am prepared to say, although not ready to formulate statistics at the present time, that the entameba coli is not the common variety of species in Louisiana, and in the neighboring Southern States it has not been found common in the stools of individuals I have examined. Just a point in connection with that to show it does occur, I recently had occasion to see a case of dysentery which presented the clinical picture of amebic dysentery, but in whose stools I could never find anything but the entameba coli. Try as hard as I could with large doses of salines, there would always be the entameba coli. This case turned out to be one of chronic Flexner-Harris infection, demonstrated by finding the aglutination reaction in the blood and isolating the Flexner-Harris bacillus in the stools. This case would not respond to the ipecac treatment.

Dr. Mason's points were practical, and for one having been an advocate of the ipecac treatment for many years, I am always glad to hear of a new convert. His point in regard to repeated examinations of the stools is important. You cannot hope to make a diagnosis of amebic dysentery always with one examination of the stools. My method is to make, on my first visit to the patient, an examination, passing a rectal tube with several windows cut into it, with snares to catch the mucus. I pass the tube about one foot, pull it out with a sudden jerk, and pull out the window portion of mucus-containing blood. If I do not find amebae readily, I will, in addition to that, pass the proctoscope and try to pick off from the ulceration in the rectum pieces of mucus-containing blood. If that is not successful, I give the patient salines to wash down these amebae which may be present in the cecum or ascending or transverse colon, as well as in the rectum. But as I have the conviction that the clinical picture is one of amebic dysentery, it may take four or five days to be absolutely certain, because there is

only one way of diagnosing amebic dysentery, and that is by finding amebae in the stools. There is no other possible way. The clinical history is not sufficiently characteristic to make the diagnosis.

In regard to the ipecac treatment, I have a few words to say. The ipecac treatment was gone over so carefully by Dr. Mason that I only want to bring up one or two points. The mode of administration is the main thing. Again, I have found, by personal conversation and in the literature, that there are those who have failed with the ipecac treatment because they have not followed the detailed methods of administering it. You cannot hope to succeed in treating amebic dysentery with ipecac if you allow a patient to walk around. The patient must go to bed for two weeks. There should be nothing short of that, no compromise. The diet during the first week is absolutely liquid, and the bowel is first washed out with saline cathartics before administering the ipecac. The idea in my mind is this: In order for the ipecac to reach the amebae, the bowel must be fairly clear of all solid material, so that it can spread and get into the crevices in every possible way. The dosage is an immaterial matter. I have never seen anybody harmed by ipecac, and I have given 100 grains in one dose and figured the salol contents of the pill as high as fifty grains in one dose. I have examined the urine to find traces of salicylic acid poisoning. Nobody in my experience has ever been harmed in the slightest by the use of ipecac or by the salol.

Dr. John T. Halsey, New Orleans—The question of the diagnosis and treatment of amebiasis is so important that it justifies me in taking a moment or two of your time. I also am a convert to ipecac, although one of the older ones. I was taught in my early practice that quinine irrigations and various other irrigations were useful in the treatment of this disease, but they failed over and over again, and I had the conviction that amebic dysentery was often an incurable disease. I saw patients get well, but I saw a number of them who had apparently gotten well in whom the disease recurred, so that I heard of them later as suffering from the old trouble and dying from it. I think there is a possibility, when we are discussing a disease like this, that the impression is conveyed that the ipecac treatment of dysentery is certain to cure every case of amebiasis that is treated with it and treated correctly. I must confess that although I have endeavored to follow out this treatment absolutely and in every detail as it has been worked out by Simon and others, I find it is not always successful. There is one great difficulty one meets with, and that is, we cannot always get properly prepared salol-coated pills, and we probably very seldom can get the salol-coated capsules with a coating just thin enough and not too thick. I have also repeatedly seen the pills pass through the intestine undissolved. These have probably often been badly coated pills, but especially in the cases of long standing those poor individuals who come to one after years and months of dysentery, and who are practically living skeletons, there are, it seems to me, physiological or pathological reasons why salol-coated pills pass through the bowel intact. The secretions, particularly the alkaline secretions of the intestine, the pancreas and liver, are very markedly diminished in cases of extreme emaciation, and I am convinced that has a bearing on the passage in the undissolved state through the bowel of the salol-coated pills. Understand, I am not knocking these pills, as they are the most practical way of giving ipecac, and are all right if they are broken up in the intestines, but we will meet with some cases in which they will not be dissolved, and we ought to have an alternative method of administration, and this we have in the old method that goes back, how many centuries I do not know, of giving a patient who has been on a liquid diet ten or fifteen minims of the tincture of opium, and half an hour or an hour later, giving him twenty or thirty or forty or more grains of finely powdered ipecac in suspension. This method has its own great advantages, and I believe is the only way in which you can give ipecac efficiently in the particular cases which will not dissolve the salol. That is a point that ought to be brought out. It will stand you in good service.

Another point is with reference to the possibility of surgical help in these cases. I am sure we will all meet cases which we are not able to cure by the ipecac or any other method of medical treatment. Such cases should be treated surgically either by appendicostomy or even better by ileostomy or colostomy with artificial anus, which will keep from the inflamed, ulcerated bowel all irritating material, which will give it physiological rest, and at the same time and through the same opening permit of our applying medicinal solutions and astringents or ipecac decoctions directly into the lower bowel.

Dr. J. B. Wallace Tampa, Fla.—As bearing on the importance of this subject, I would like to say something about the experience we had in Tampa a few months ago. I do not know how many cases of amebic dysentery we had down there; the diagnosis was made in the laboratory in thirty-five cases, but in addition to these, there were about fifty cases of abscess of the liver operated on at the local hospitals during the first four or five months of the year. The consensus of opinion was that the epidemic was due to infection from uncooked vegetables, lettuce particularly. It is possible that sporadic cases of amebic dysentery occurring in localities remote from the tropics may be due to the use of uncooked, infected vegetables coming from regions where it is prevalent. We have been thoroughly converted to the use of ipecac in these cases. In referring to the use of ipecac, Dr. Mason spoke of the time when it should be given; we first used it in a case where the patient was desperately ill, and after we had unsuccessfully tried practically everything else; after a few doses the patient began to recover. The majority of our cases were rather mild types of dysentery; in practically all the cases of abscess of the liver no diagnosis of amebic dysentery had been made. The history usually given was of a mild type of dysentery that had not been treated.

Dr. John L. Jelks, Memphis, Tenn.—If I loved a

fair little lady so well as some of my friends love ipecac, I would lean over and kiss her hand. That would be homage enough. I have seen two cases of amebic dysentery that originated in Denver, Col. Amebic dysentery had appeared sporadically, I am informed by the post surgeons in Yellowstone Park, while I was there. Lettuce and other raw vegetables, together with the indiscriminate use of them when the soil on which they are grown is fertilized with human excreta, is one of the prolific sources of amebic dysentery. Why should railroads be allowed to scatter amebae along their lines with utter disregard of State rights and with utter disregard of the protection of our people? We know that there is the indiscriminate interstate distribution of hookworms and amebae from one end of a railroad to another. This effete material should be controlled the same as any other dangerous products, and not scattered over the railroads for flies to carry amebae from there to the lettuce plants where they are likely to roost during a hot day. Human excreta distributed over vegetables and upon seeds is another dangerous thing that this Government should stop. Do not bring the excreta to your office; take your microscope to the patient. You may go into the rectum and scrape the mucosa, and if you find ulcers, there is where you are apt to find amebae. I have examined the excreta of human beings for ameba hystolitica, and not being able to find it after repeated examinations, later I have found it. When you find amebae with the presence of pseudopodia, do not stop, but treat the case for amebic dysentery. It is unnecessary to have the symptom dysentery for amebiasis. I have operated on an enormous liver abscess in which there was absolutely no history of dysentery. Salol will do good, and I believe it will do more good than ipecac, and yet I know that these gentlemen are just as honest as I am, and I know that I am honest, and I am going to prove it to them. I have tried the use of ipecac by the mouth; I have tried ipecac through salol-coated pills, and have put it through the appendicostomy openings in large quantities. I have had doctors testify as to this and patients testify to it. For instance, when I asked a doctor, "Have you taken ipecac treatments?" he replied, "Oh, I have taken a peck of that." Why did he not get well? He had lost 100 pounds in weight. I did not perform a dangerous operation. You have got no right to lose a patient by ceco-appendicostomy. Out of three patients operated upon, one sat up the first day after the operation; another the second day, and the third sat up in about the third day. Is it a dangerous operation? No. The performance of appendico-cecostomy is preferable to any other procedure, and not appendicostomy, which is not suitable for these cases. By the use of formo-boric solution you can control the dysentery without any great danger and without any trouble. You can control the diarrhea. You may give ipecac if you want to; but, gentlemen, treat the disease locally. It is a local infection of the colon, the upper rectum and the sigmoid. But you can treat the disease locally by nitrate of silver applications to the diseased area below and by formoboric irrigations. That is my treatment.

Dr. Stevens T. Harris, Highlands, N. C.—I have been very much interested in what has been said in reference to this subject. I have had considerable experience with this disease. It was my good fortune to be connected with the First Reserve Hospital in Manila for a while, where we had any amount of amebic dysentery. We used all manner of treatments there, and, of course, as the routine treatment we resorted to ipecac. I cannot say that we found it anything like a specific for the disease. I would like to say in regard to what Dr. Wallace said in reference to giving opium as a preliminary procedure, giving the ipecac in a bolus or in suspension is good treatment.

There is one treatment that has not been mentioned here today which, to my mind, is the summum bonum of treatment of amebic dysentery, and that is irrigations by peroxide of hydrogen. I have never yet seen a case that did not respond to this treatment

There is one other treatment that is to be remembered, and which has a salutary effect, and that is the use of urotropin In addition to this treatment, it is very essential that the patient should receive rest in bed. In fact, it is as important as any other part of the treatment.

Dr. J. B. Elliott, New Orleans—If we understand thoroughly the pathology of amebic dysentery, I cannot see how we can use enemas or rectal injections to cure a case of amebic dysentery. When we realize that the amebae are buried in the mucosa and sub-mucosa, and even down into the muscle layer of the bowel, how can we ever believe that we can drive quinine or anything else up into that bowel, to have it hunt out, search for and kill the amebae? We must act through the blood. We must bring the opsonins, the antibodies to bear. We must increase the serum and therewith the antibodies through the whole course of the large bowel. The opsonins are the cause of the death of the amebae. They prepare the amebae for ingestion by the phagocytes. How irrigations can hunt out amebae and strangle them, I cannot understand.

I am a thorough convert to the use of ipecac. A patient who came to the Charity Hospital last week for hemorrhoids had a typical case of amebic dysentery. The next patient came in with a diagnosis of tuberculosis of the bowel, a very rare disease in our opinion. Tubercular enteritis is a rare thing unless the lung is very much involved. The second case gave a history of loose bowels extending over a period of eighteen months, with intervals of freedom from looseness of the bowels. These were cases of amebic dysentery. In the last four weeks I have seen seven cases of amebic dysentery, all of which came in either with a diagnosis of tuberculosis of the bowels or hemorrhoids. We found the amebae in the stools. We followed this plan: We had the patients walk over to the laboratories, where the students can examine the stools under the microscope, and we show them the amebae. When the diagnosis of amebic dysentery is made we follow with sixty grains of ipecac the first night, fifty the second night, and forty the third night, decreasing by ten grains each night; then ten grains of ipecac every

night for five days, and ipecac off and on again if they should have a recurrence. In some cases I have used coal oil and water by enema, half and half, and the results were fairly good when it was first used, but I have given that up and am sticking now to ipecac alone, plus rest and a careful diet.

Dr. J. E. Paullin, Atlanta, Ga.—I did not have the pleasure of hearing these papers on amebic dysentery, but I had quite an experience with the disease this summer, having seen an unusual number of cases. I treated the first series with the usual routine of ipecac administered very much after the manner Dr. Elliott has been giving it. I used also in quite a number of these cases, and particularly in one man who had from twenty to thirty stools a day, and in each stool there were any number of the entameba hystolitica, an injection of argyrol, one per cent of a two per cent solution, which is non-irritating, and the man retained it in his bowel over night. This was the most soothing thing as an irrigation which I could get for him. There was no other treatment resorted to for two or three days until his stools came down to three or four a day. I used in other cases equal parts of liquid albolene and coal oil. I found after these irrigations that the number of stools diminished and the amebae diminished temporarily. By accident, however, I happened to find out another drug which was used for another purpose, and which gave me a very surprising result. I realize fully the statement I am making is not a conclusion, but a simple statement, and that it is drawn from entirely too few cases. But in one gentleman who had amebic dysentery, and who was having from eighteen to twenty stools a day, and who had that dysentery for two years off and on, examination of the stools showed any number of entameba. He happened to have syphilis at the same time; he was given an injection by another individual of salvarsan, and within two or three days he had a firm stool, the first solid stool he had had in several months Examination of the stools after that did not show any entamebae. I do not know whether he is well yet or not. It may be simply a coincidence. I happened to have had one other case of amebic dysentery, the patient receiving an intravenous injection of neosalvarsan with the same results. This was only two weeks ago. The second patient did not have syphilis, but amebic dysentery. He received intravenous injections of neosalvarsan, and my attention was directed to the possibility in this case of the value of this drug, and I would not say that these cases are well. However, I have not found entameba in the stools since the injection. My attention was directed to that agent by Dr. Ballinger, who happened to have given salvarsan to a man who had had dysentery for a considerable length of time, and at the same time he had syphilis. As to whether it is worth anything or not, I do not know. As I said, there have been no symptoms of dysentery nor entamebae in the stools since. I have found some patients who could not take ipecac, and in those recently I have given them the deodorized tincture of opium beforehand or a hypodermic injection of morphine The ipecac seems to upset them. I have also used salol-coated pills in these cases who could not take ipecac. I have treated them in that way, then I have put the salol-coated pill in a capsule, and then put the capsule in a one per cent solution of formaldehyde and water. This hardens the gelatin of the capsule, and by drying it for a certain length of time it will not dissolve in the stomach. I have found some patients who would become nauseated and depressed from the use of ipecac. In these cases I have given the patients flower of sulphur. Of course, the flower of sulphur will produce in these patients a slight diarrhea. It has caused, at times, a temporary disappearance of amebae from the stools. As to whether that is worth very much or not, I do not know. The cases are very few.

Dr. William Litterer, Nashville, Tenn.—With reference to the distribution of the entameba coli, I cannot subscribe to the statement that has been made, that it is not widespread. I am only speaking from my investigations in the city of Nashville and State of Tennessee I find that it is quite prevalent there. We found the entameba coli in a number of cases, and we have found it in conditions other than regular amebic dysentery. By giving the patients a saline purge it will bring out occasionally the amebae.

As to the differentiation in fresh specimens, I think it is quite difficult to tell the difference between entameba coli and hystolitica and the tetragens, and this is especially true if you have not the phagocytosis or the red blood cell, a point made by Dr. Simon, and which I heartily endorse. I believe that is a safe rule to follow, that unless you have them it is difficult to tell the difference in the living culture without staining, and especially in the encysted stage. We get specimens sent in by means of which it is easy to diagnose entameba coli. By letting the specimen stand for forty-eight hours you can see the nuclei, and that will tell you at once as to whether it is nonpathogenic or not. As Dr. Simon has pointed out, where you find these red blood cells going on, and you are treating some of the cases, you will have ameba hystolitica in which there will be no red blood cells engulfed.

As to the treatment, I have been an advocate of the use of ipecac in these cases. It is certainly convincing, after you once give this medicine, to see the disappearance of the hystolitica. Often you cannot revive them if you have scraped the ulcers. They appear to be dead or paralyzed in some way

With Dr. Jelks, I believe the best means in making a diagnosis is by examining the scrapings from the ulcers. The rectal tube is the second best means of making a diagnosis, but the scrapings of the ulcers is the best, and even then sometimes you may not be able to find the amebae.

Dr. C. C. Bass, New Orleans.—I should like to point out a possible error in depending upon scrapings from the rectum and lower bowel for the diagnosis of amebic infection. We must fully realize that the pathologic lesions of this disease are located chiefly considerably above that point, and especially about the flexures and frequently at the cecum.

With reference to examining the sigmoid with

the proctoscope, if we only go that far with our examination and treatment of the ulcers present, I am afraid it would not have a great deal to do with curing a case of amebic colitis. It may and probably is the best method of curing chronic ulcers or amebic ulcers, or any other kind of ulcers in the rectum and lower bowel, but when we consider the disease amebiasis, it is highly improbable that the treatment of a few ulcers in the rectum would have much to do with curing the disease, which usually extends to the cecum.

Dr. John L. Jelks, Memphis.—I find the amebae in the appendix oftentimes.

Dr. Bass—Yes, but you cannot reach the appendix or anywhere near that with the proctoscope. There is a great distance between the appendix and rectum that cannot be reached either by operation on the appendix or by the proctoscope.

Dr. Charles F. Craig, Washington, D. C. (closing the discussion)—In Dr. Mason's paper mention is made of the percentage of **coli** infections, and I stated that the percentage varies greatly in different localities, and I have no doubt in some localities you will find practically no infection with coli, while in others you will find a large percentage. While I was in San Francisco I examined about 100 young men, soldiers, men from all parts of the country, and found sixty per cent of them infected.

Dr. Mason—Had these soldiers been examined before going to the Philippines?

Dr. Craig—Yes; they were recruited from all parts of the United States and were examined before they went to the Philippines, and sixty per cent of them showed **coli** infection. It looks, therefore, as though the **coli** infection was pretty widespread A point of great importance is the number of specimens examined. One ought to examine eight or ten to be sure the organism is not there. If that number of specimens be examined in every case you will find, I believe, that from twenty to fifty per cent will show **coli** infections, if a large number of people be examined. You will find local epidemics where people are reinfecting one another continually, and in such places you would have a high percentage.

I want to endorse the statements regarding the treatment of dysentery with ipecac. I had the good fortune to be stationed at San Francisco in the Army General Hospital when we had hundreds of cases of amebic dysentery returned from the Philippines. We gave quinine injections, and argyrol injections, and I agree with Dr. Elliott in asking, how one can expect to cure amebic dysentery by washing the amebae from the wall of the intestine, when they are also embedded deep in the sub-mucosa and the capillaries of muscular tissue?

Dr. Harris.—Did you try peroxide of hydrogen irrigations?

Dr. Craig—Yes, and with only temporary benefit. If we remember, these organisms are too deep in the tissues, the ones that are doing a great deal of damage, for the irrigations to reach. While the irrigation treatment will do some good, and will get rid of a large number of amebae and prevent some ulceration, it will not affect the amebae situated deeply in the tissues. The ipecac does that, but how it acts we do not know

Dr. Elliott's idea of the use of serum is a good one, but according to the recent work done by Rogers, ipecac is considered the specific against amebae. In other words, he is treating all dysentery cases by the intravenous injection of emetin, one of the active principles of ipecac, and is getting marvelous results. He is treating these cases from within instead of from without.

The relation of amebae to pellagra is one of coincidence. A large number of patients affected with pellagra will show amebae in the stools, and the amebae may aggravate the disease, but there is no direct etiological relationship, in my estimation.

As regards the method of transmission of amebic infection, the idea put forward by Dr. Simon regarding bananas is one that deserves attention. The class of people who pack bananas and handle them are apt to infect bananas with fecal material. There are a lot of people in tropical countries who are not very careful about hygiene. The idea we used to have of water being a great source of amebic infection is gradually being given up. I know when I was in Manila the water supply was badly infected, and we could cultivate amebae from the water, and a great deal of discussion arose as to whether, when we put in a new water supply there, we could get rid of the amebae by filtration. They have a new water supply, but the amebae still come through. But these amebae are not pathogenic amebae, and Walker has pointed out that if you add feces to distilled water or common water and allow it to stand, the parasite amebae cannot live for any great length of time in water. The general opinion of Walker, in the Philippines, and of Darling, in Panama, is that amebic dysentery is transmitted only occasionally by water. It is generally transmitted by direct infection of food with feces, simply contact cases.

With regard to the distribution of amebic dysentery, I agree with what has been said, that it is not confined to the South. I have seen cases originating in Illinois, Minnesota and Michigan, and they are being continually reported. Of course, we have more amebic dysentery in the South than in the North, but we have it all over the country.

Dr. E. M. Mason, Birmingham (closing the discussion)—I have been much edified by the liberal discussion on the subject of amebiasis. The time is passing rapidly, and I shall not continue the discussion except to say to my friends who oppose the ipecac treatment, that I sympathize with them thoroughly, because I felt exactly that way myself a year ago, and I believe that in time they, too, will be saved. (Laughter.)

OLD UNUNITED FRACTURE OF ANATOMIC NECK OF FEMUR—WITH SUGGESTIONS FOR THE IMMEDIATE TREATMENT OF THIS FRACTURE.

By John B. Murphy, A.M., M.D., LL.D.,
Chicago, Ill.

It is not our intention to devote much space to the treatment of recent fractures of the neck of the femur, because every practitioner feels that he has solved that problem for himself. There are cases, and by no means few in number, in which every effort to effect union has proved futile. No matter how long the treatment is persisted in union does not take place. It is not because the fragments are not in alignment, nor because immobilization is imperfect or not maintained for a sufficiently long period of time, that failure is the result.

Urion cannot take place in some cases because the fragments are not contacting. Soft tissue, capsule and periosteal fragments are interposed between them, and it is a well-known clinical observation, one frequently made, that whenever any substance, tissue or foreign material is interposed between two bones or bone fragments union cannot take place. A second reason is the feeble osteogenetic power of the bone fragments at the line of fracture. A third is the difficulty of perfect immobilization, "unless very definite and positive conditions are observed and acted on." A fourth is that absorption of the neck takes place from the diminished blood supply to the proximal end of the distal fragment, a purely anatomic reason, full details of which were given in my address on the subject delivered before the Western Surgical Association a few years ago. A fifth cause is that the fragments are not in perfect alignment and firmly immobilized.

In order that such union may occur accurate and firm contacting between living bone must be obtained and maintained, so that the osteogenetic elements may travel from one fragment to the other. This is the basis of success in the treatment of any and all fractures, and of the transplantation of bone as we have carried it out in our work for a considerable number of years past. Unless such approximation and contacting is secured failure will always be the result of all efforts to secure union.

In the case of these old ununited fractures of the anatomic neck of the femur, the history of pain and discomfort, inability to walk without the aid of cane or crutches, superadduction or limitation of abduction usually dates back some little time. The relationship of trauma to the condition is always easily established. The diagnosis of fracture may or may not have been previously made. The patient often says that a fracture was sustained, but that it was "set" and the leg placed in a plaster-of-Paris cast. When the cast was removed the deformity previously present had disappeared, but discomfort, limitation of motion and inability to use the leg were still present.

Some of these patients can hear the crepitation. As time goes on the leg becomes shorter than its fellow. In some cases the only symptom complained of is a weakness in the affected leg and limitation of abduction and absence of circumduction. The skiagram, if taken from only one angle, may not reveal a fracture, emphasizing the extreme importance of always making skiagrams from more than one angle. The fragments may appear to be in apposition and approximated, or widely separated, but in every case it will be found that tissue is interposed between the fragments. This tissue is usually the capsule of the joint.

When the fracture is sustained the capsule is suddenly stretched to its maximum, and it is torn. Normally, the capsule of the hip joint is redundant behind and below, and when it is torn the larger bone fragment, as it slides forward, drags the capsule in between the two bone fragments. It is held there, and absolutely prevents bony union. The osteogenetic elements cannot penetrate the interposed tissue, and therefore union does not take place, not even a fibrous union.

It is in these cases that an open operation is positively indicated. No other form of treatment can be effective. The interposing tissue must be removed, the fragments placed in apposition, and contacting maintained until bony union has taken place. The osteogenetic elements must be given sufficient time to pass from one fragment to the other.

We have not followed one single plan of procedure in exposing the fracture in these cases. The joint may be exposed by a longitudinal incision over the trochanter major, extending three inches above it and three inches below it, or by a U-shaped incision surrounding the trochanter. The anterior fibers of the gluteus medius muscle may have to be cut, and can be cut without endangering the subsequent functioning of the joint. If the trochanter must be removed, as is necessary in some cases in which much luxation has occurred, a Gigli saw is then passed beneath the muscles attached to the trochanter and the trochanter is divided. By adducting the leg and turning the foot outward the fractured end of the neck of the femur and the shaft are easily exposed. If the trochanter is not to be removed the incision should be a straight one on a line extending from

the anterior superior iliac spine to the most prominent portion of the trochanter, the incision beginning about the middle of this line and extending down to and below the trochanter. We have called this the iliotrochanteric incision. In this case the fascia lata is divided, the fibers of the gluteus medius muscle are separated, not cut, giving one immediate access to the fracture of the neck of the femur.

It will be noted that with this incision the fibers of the gluteus medius muscle are not divided, as is the case when the U-shaped incision is made. The muscle fibers do not need to be divided to give access to the fracture. They are merely separated and retracted out of the field. The fracture is plainly in view. Any interposing tissue is removed with scalpel and scissors, the ends of the fragments are freshened with the chisel and then approximated. With two or more 8, 10 or 12-penny wire nails, driven through the neck into the head from the shaft side of the bone, apposition is maintained. The trochanter, if it has been removed, is then nailed back into position with one wire nail.

The soft parts are sutured with chromicized catgut and the skin with horse hair. No drain. The wound is dusted with bismuth subiodid powder, sealed with collodion gauze, and a large five per cent phenol gauze dressing is then applied. No cast. Both legs are then placed in a travois splint (Figs. 1 and 2), worked out by Dr. Rainey, my former interne, so as to insure abduction of the affected leg. If only one leg is abducted the patient's body, unknown to him, usually, however, intentionally to make him more comfortable, is drawn over to the opposite side so that the well leg and not the operated leg is in abduction. Therefore, we always abduct both legs. The patient is left in this position for from six weeks to three months, depending on his or her age. The stitches are removed in two or three weeks. After three months the patient is allowed to get up and begin to put some weight on the leg. We have had fifteen such cases in the past four years. Reports of a few of these cases will serve to illustrate some of the most important points which we wish to emphasize.

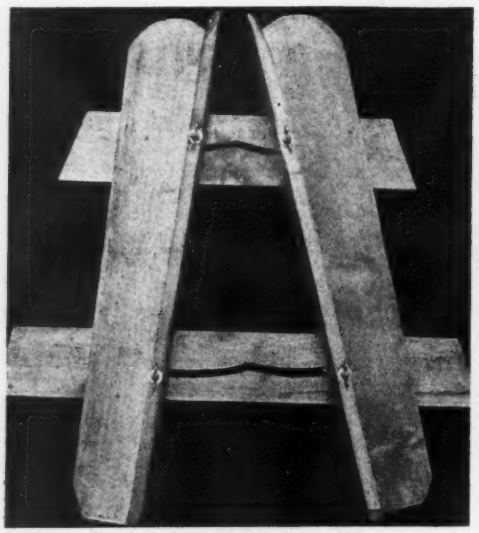

FIG. 1—Front view of travois splint. The two longitudinal troughs in which the legs rest are three feet long. The two horizontal boards on which these troughs rest are thirty-three and twenty-five inches long respectively. The width of all of these boards is six inches. The slots are one-half inch wide, and of any length that may be desired. We usually have the lower one eighteen inches long and the upper one ten inches long. The side troughs are adjusted by means of the screws which are attached to the bolts driven in the slots. Any carpenter can make this splint. The troughs are padded with cotton before the legs are placed in them.

FIG. 2—Rear view of travois splint, showing details of the slots.

REPORT OF CASES.

Case I.—Mrs. C. V., aged 58. Admitted to Mercy Hospital, June 18, 1910. In 1905, while stepping backward from a slowly moving car, she landed on her right foot and fell to the ground, striking on her right hip. She was carried home and an osteopath called, who told her that her hip was dislo-

cated, and proceeded to reduce it. No cast or dressing was applied. Massage was instituted and continued up to the present time. Five months after the injury she was able to get around with crutches, but walked with a decided limp. There was slight pain in the hip on motion and some stiffness in the knee. She could not cross the right leg over the left without manual assistance. No loss of sensation. Pressure over the hip is slightly tender. There has always been an enlargement of the hip since the accident.

Examination—Right leg, 33 1-3 inches; left leg, 35 1-2 inches. Tip of right trochanter almost up to level of a line drawn at right angles to the body through the anterior superior spine of the ilium. Tip of left trochanter 2 1-2 inches below this line. Arc of rotation was greater in left than in right hip. In walking there is a drooping to the right side, despite a high heel. Skiagram showed failure of union in old fracture of neck of femur.

Treatment—U-shaped incision, flap retracted upward. Trochanter sawed off with Gigli saw. Anterior fibers of gluteus medius cut. Free exposure of fracture. We found a fracture of the anatomic neck of the femur, with a large mass of cicatricial tissue surrounding the head of the bone. There was no effort at bony union. The head was exposed, the fractured surfaces freshened down to the cancellated bony tissue, and two nails were driven from the external surface of the shaft through it and through the neck well into the head. Patient placed in recumbent position with both legs abducted. (Figs. 3 and 4.)

Result—Primary union of soft parts and firm, bony union. Function normal.

Case II.—Mrs. C. P. S., aged 57. Admitted to Mercy Hospital, October 16, 1909. January 3, 1909, she fell on her left side and claims that her left leg was not underneath. Severe pain in the posterior and lower portion of the thigh above the knee was felt immediately. There was an ecchymotic spot the size of a half dollar on outer side of thigh below the trochanter. No pain in or around hip. She got up and sat in a chair and soon afterward managed to walk to the bath room and take a hot bath, believing this would relieve the pain and help the bruise. A doctor was called and rotated the limb and also flexed it. Six days later electrical treatment was applied to the hip, and the first shock caused her to evert the leg voluntarily, and she was unable to straighten it out again. She also had severe pain in the region of the hip joint. A second physician stated that she had an impacted fracture of the femur. He made a circular cast of a pillow which he fastened with pins, and the leg was kept in this position for nine weeks. From that time on the patient could flex the leg, move it inward and outward, but when she stood on it it felt as if she were walking on a cushion.

FIG. 3—Case I. Fracture of the neck of the femur with upward displacement of the shaft and separation of fragments.

FIG. 4—Case I. Three months after operation, with nails still in place.

Examination—Patient apparently had good motion in the hip, but was unable to bear her weight on the leg. The skiagram showed that there was a considerable upward luxation of the shaft of the bone, which the shortening of the leg had led us to believe was present. The fragments were not approximated, so that we were convinced that some soft tissue was interposing, preventing union from taking place.

Treatment—A U-shaped flap was made over the greater trochanter, consisting of skin, fat and fascia. When this flap was raised the bone was in view. As shown in the skiagram, there was an upward displacement of the shaft of about an inch and a half; the broken-off head of the bone was in the acetabulum, and a portion of the capsule was interposed between the fragments. The anterior fibers of the gluteus medius were cut and the trochanter was sawed off in the usual manner with a Gigli saw. The soft tissue was dissected out with scalpel and scissors, and the ends of the fragments were freshened. The head of the bone was found to be living. Contact between the fragments was readily obtained and secured by means of two nails driven from the trochanteric surface through the neck into the head of the bone. The trochanter was nailed back in position with one wire nail. The deep tissues were closed with catgut stitches and the skin with horsehair. The muscle fibers that were cut were not sutured. The wound was dusted with bismuth subiodid, sealed with collodion gauze, and then a 5 per cent phenol gauze dressing was applied. Both legs were placed in the travois splint, in extreme abduction. The subsequent course of the case was uneventful. The skin stitches were removed three weeks after the operation. Primary healing. The splint was taken off seven weeks after the operation. Motion in the hip joint was perfect. No apparent shortening of the leg. Unfortunately, this patient died four months after the operation from intercurrent affection, in no way related to the trouble for which she came to the hospital. The hip at the time of death was in splendid condition. (Figs. 5 and 6.)

FIG. 5—Case II. Nine and one-half months after the injury. Fracture of the neck with considerable upward luxation of shaft of bone. Fragments not approximated. Head in acetabulum.

FIG. 6—Case II. Seven weeks after operation. Bony union. The nails are still in place.

Case III.—Miss F. McC., aged 35. Admitted to hospital, September 4, 1911. August 30, 1909, when walking down some stairs her left heel caught in the step and the patient fell forward and twisted around in a half circle, turning to the right side and landing on her left hip. Could not get up on account of great pain. Says she felt paralyzed and hardly tried to get up, believing it was of no use. Was assisted to a cot and later to a cab (sitting up) and finally in bed. Could not move hip joint and could not bend or sit up. Pains were severe for two weeks—nothing done except bracing with pillows. After two weeks pains gradually became less severe and patient could sit up and raise herself in bed. Was in bed two weeks more and finally up on crutches for four months during which time improved as to pain and mobility, and could bear her weight on leg on floor. Then began to walk with one crutch for six months, bearing more weight on

leg. For a year has walked with a cane. Has some pain in hip when walking much.

Examination—Patient walked with a slight limp, and there was a shortening of the leg of about an inch. Mobility of the joint was fairly good. Skiagram showed upward luxation of the shaft of the bone, and a wide separation of the fragments. (Fig. 7.)

Treatment—The U-shaped incision was made to expose the joint. The anterior fibers of the gluteus medius were cut, and the tip of the trochanter was sawed off with the chain saw and retracted upward.

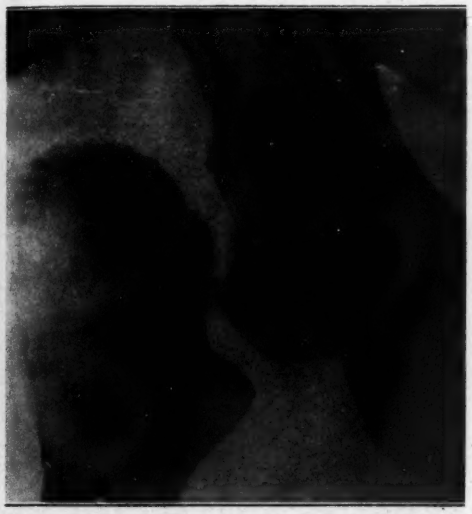

FIG. 7—Case III. Fracture of anatomic neck with wide separation of fragments and upward dislocation of shaft of bone. Head in acetabulum.

By adduction and external rotation of the leg the shaft end of the fragment was turned upward. It was completely covered by a portion of the capsule of the joint, which had effectively prevented bony union. The soft tissue was removed, the ends of the bone were freshened, placed in apposition and securely nailed with two wire nails, in the usual manner. The head of the bone was alive. The remaining portion of the capsule was sutured around the fragments. The gluteus medius muscle fibers were approximated and sutured with catgut. The trochanter was also nailed back in position with one nail. The wound was closed with deep catgut and silkworm gut sutures, and the skin with horse hair. The tendon of the adductor longis was divided subcutaneously. The wound was dressed as usual with powder, collodion gauze and 5 per cent phenol gauze. The legs were placed in the travois splint in extreme abduction. The stitches were removed about the eighteenth day. Primary healing. Patient was taken out of the splint at the end of the fifth week. The patient obtained splendid use of her leg. (Figs. 8, 9 and 10.)

Case IV.—Mr. J. H., aged 61. Admitted to Mercy Hospital, October 14, 1911. October 13, 1908, while struggling with a companion he turned suddenly and injured his right hip. He was carried to his carriage and driven four miles to his home. Remained in bed four days, during which time he

FIG. 8—Case III six months after operation. Bony union between fragments. Position of bone normal. Nails and phosphor bronze wire show plainly.

could feel a grating sensation when his limb was moved. The doctor was called and applied liniment, and at the end of nine days the patient was taken to a hospital and fracture of the hip was diagnosed. Patient says the skiagram was negative. Was in the hospital four weeks during which time he wore a long splint extending from the axilla to the bottom of the foot. All this time he was allowed to walk about on crutches. Had constant paint in hip. At the end of four weeks splint was removed and patient allowed to go home. Says he could still feel crepitation in his hip at the time he left the hospital. Has continued to use crutches and has been unable to put any weight on his limb.

Examination—Patient can adduct and abduct the leg. Has the power of external and internal rotation, but cannot raise the leg when lying flat in bed.

The skiagram showed a fracture of the anatomic neck of the femur, with slight upward displacement of the shaft of the femur. The head was in the acetabulum. No attempt at union of the fractured neck of the femur. (Fig. 11.)

Treatment—A U-shaped incision was made, the trochanter lying in the center of the U. The anterior fibers of the gluteus medius were cut. The trochanter was divided with a Gigli saw. By adducting the leg and turning the foot outward the fragments were readily exposed. Fibrous tissue was interposed, thus effectually preventing bony union. This tissue was removed with scissors and scalpel and the ends of the fragments were freshened. The

FIG. 9—Case III. Showing ability to elevate the leg voluntarily.

FIG. 10—Case III. No shortening of leg, with ability to bear full weight on it.

head of the bone was alive. By adducting the leg and making inward rotation the two fragments were approximated and this position was secured by means of two wire nails driven from the shaft side of the bone through the neck and into the head. The trochanter was nailed back in position with a third nail. The wound was then closed with a few deep catgut sutures and the skin with horse hair. No drain. The usual dusting powder, collodion gauze and 5 per cent phenol gauze dressing was applied and the legs placed in a travois splint. The stitches were removed in three weeks. Primary healing. (Fig. 12.)

Result—This man made a very good recovery. When he left the hospital he had good motion in the hip.

Case V.—Mr. E. B., aged 41. Admitted to Mercy Hospital, January 3, 1912, because of an ununited fracture of the neck of the femur. February 16, 1910, patient slipped and fell, striking his hip on the street car track. He was unable to rise and was carried home. The physician in charge made a diagnosis of dislocation of the hip, and the patient was kept in bed for three weeks, during which time he experienced some pain in the right knee and over the sacrum. He commenced walking on crutches at the end of four weeks and discarded them at the end of four months. Since then he has

FIG. 11—Case IV. Fracture of anatomic neck of femur with slight displacement of shaft. Head in acetabulum and separation of fragments.

walked with a cane. It does not pain him to walk, but there is a noticeable limp from a 2 1-4-inch shortening, and he is unable to flex the thigh on the abdomen when in a sitting position, or to cross the injured leg on the other.

Examination—This showed a 2 1-2-inch shortening of the leg with internal rotation and an apparent sliding upward whenever pressure was placed on the limb. Diagnosis was made of fracture of the neck of the femur, with non-union. (Fig. 13.)

Treatment—The joint was exposed by a half-U-shaped incision of the soft parts and fascia. Chain saw division of the trochanter. A portion of the capsule was found entering between the neck and the head, the latter being broken off on a level with

the margin of the acetabulum. The ends of the fragments were covered over with cartilage between the segments of interposed capsule. The femur was avulsed and the fractured head was seen lodged in the acetabulum. The ends of both fragments were freshened with the chisel and then approximated. Two nails were used to fix the head to the neck and one nail to place the trochanter back in position. The wound was closed in the usual way. (Fig. 14.)

Result—Primary union followed. The leg had been dressed in the supreme abducted position, with the Rainey abductor splint. When this patient left the hospital the skiagram showed that there was a

FIG. 12—Case IV. Six weeks after operation. The two long nails are driven through the shaft into the head fragment. The short nail holds the trochanter in place. Good position of shaft, with bony union between the fragments.

firm attachment of the neck to the head. He could place his weight on the limb with but little pain. Early in April, 1912, another skiagram was made and showed that there was some absorption or rarefaction around the nails, so that it was deemed advisable to remove them. The union between the fragments was firm and the functional result was perfect. On account of the interposition of the capsule between the fragments in this case a bony union could not take place, no matter what the primary dressing had been. November, 1912, the patient was seen again. He had splendid motion in all directions, and except for a slight shortening of the leg about three-four.hs of an inch there was no ocular evidence of his fracture. The skiagram showed that bony union had taken place. (Figs. 15 and 16.)

Case VI.—Miss D., aged 60, came to hospital on account of an old fracture of the neck of the femur. About the middle of May, 1892, while standing on a step-ladder, the ladder slipped and the patient fell, striking the ground on her left hip, her leg being flexed under the body. The skin over the trochanter was badly bruised. Pain in the hip was so intense that the patient could not be moved from a couch for ten days. She was then put to bed, and limb steadied with sandbags. Foot could not be moved for three weeks, when motion gradually re-

FIG. 13—Case V. Fracture through the neck with considerable shortening, due to upward displacement of shaft.

turned. It is only during the last few weeks that she has been able to swing the leg forward and backward. Still has pain in the hip, but it is less severe than at first. August 1, 1912, the leg began to swell, and has remained so ever since. Pain is not severe and patient has no fever, so far as she knows. Since then there is shortening of the leg. Patient is unable to walk without crutches.

Examination—The left leg is swollen and hip is very tender to pressure. The skiagram showed a complete fracture of the anatomic neck of the bone, near the trochanter, with separation of the fragments. No absorption of neck. (Fig. 17.)

Treatment—A longitudinal incision, extending over the trochanter on the ilio-trochanteric line,

about six inches in length, gave a good exposure of the field of operation. The anterior fibers of the gluteus medius were retracted. The trochanter was not sawed off. When the shaft end of the bone was avulsed it was found that the head of the bone was in the acetabulum, but rotated. It was still alive. It was brought back into position. The ends of the fragments were freshened, approximated, and secured in position by means of two wire nails driven through the neck and head of the bone from the external surface of the shaft. The capsule was closed with chromicized catgut sutures, and the muscle fibers were approximated and likewise sutured with catgut. Deep figure-of-eight silkworm gut sutures closed the wound. The edges of the skin incision were approximated with horse hair. The wound was dusted with bismuth subiodid, sealed with collodion gauze and dressed with 5 per cent moist phenol gauze. Both legs were placed in the travois splint and a Buck's extension with a 20-pound weight attached was put on the affected limb. Two and a half months after the operation the patient is still being kept quiet, on her back. The stitches have not yet been removed. The skiagram shows that there is bony union and perfect position of the joint. (Fig. 18.)

FIG. 14—Case V. Three months after opertion. Good position of leg, with bony union between fragments.

FIG. 15—Case V. Eleven months after operation. The nails have been removed and regeneration is progressing favorably.

Case VII.—Mr. C., aged 48, came to the hospital on account of an ununited fracture of neck of right femur, September 24, 1911. July 13, 1910, patient was coming out through a window eighteen inches from the ground when his foot slipped and he fell, striking an asphalt pavement on his right hip. He had to be carried to bed. His hip pained him greatly, but he was not much bruised. The pain got so severe that he called a doctor, who gave him a hypodermic of morphin. Two days later, after a consultation, the patient was anesthetized. The conclusion arrived at was that there was no fracture. One doctor said that there was a half an inch shortening of the leg. In three weeks he was going about on crutches. After a few days he began to have severe pains in the hip again. The next day a skiagram was made and a fracture of the anatomic neck of the femur was found. A plaster cast was put on, extending from chest to knee, with the leg in a straight position. A week later a second consultation was held in which three doctors took part. Another skiagram was made. On examining this plate it was decided that there was no fracture and the plaster cast was taken off. He then went to Europe, but had to use crutches. When he returned five weeks later he had another skiagram made. This showed a fracture of the anatomic neck of the femur very plainly. It was thought that union had taken place, however, and he discontinued using the crutches and got about with a cane for a year. October, 1911, he had to start using crutches again, as the hip had become very painful. In December,

1911, the patient could feel the grating sensation in the hip, as ends of fragments rubbed against each other. In January, 1912, an extension was put on. This relieved pains in the hip. May, 1912, more skiagrams were made and non-union was definitely diagnosed.

Examination—The limb is two inches shorter than the left. There is great thickening of the trochanter and the tip of the trochanter is almost on a level with the anterior superior spine. The skiagram (Fig. 20) shows fracture of the anatomic neck of the femur, with non-union and wide separation of fragments. There was considerable absorption of the neck, clear out to the shaft, leaving only a button of bone in the acetabulum on an exact level with the epiphyseal line. The fracture occurred near the epiphyseal line and that the absorption of the neck has taken place from within outward, which is the characteristic course for this absorption. (Figs. 19 and 20.)

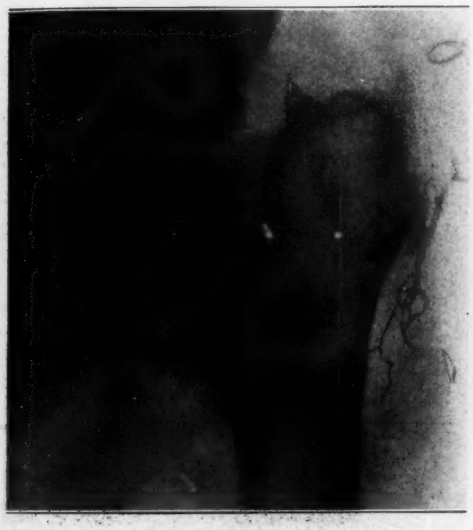

FIG. 16.—Case V. Fifteen months after operation. There is firm bony union.

FIG. 17—Case VI. Fracture of anatomic neck, with separation of fragments, but no absorption of bone.

Treatment—The joint was exposed through a longitudinal incision. The anterior gluteus medius fibers were cut, the trochanter sawed off with a Gigli saw and the capsule opened. It contained a large quantity of sanguineous fluid. The neck was absorbed back to the level of the lesser trochanter. On external rotation the proximal end of the neck fragment was found to be eburnated and covered with cartilage. The head of the bone was in the acetabulum, alive, eburnated, fractured surface, but not covered with cartilage. The surfaces of the bones were freshened. Slight oozing from the head in the acetabulum showed that the blood supply from the ligamentum teres was sufficient to maintain its vitality. Base of neck was freshened and cancellated tissue was found. The fragments were approximated and secured by three nails driven through the neck into the head from the shaft side, with leg in abducted position. One nail went through the trochanter and head into the acetabulum. The wound was closed with deep catgut and silkworm gut sutures. The skin was approximated with horse hair, dusted with bismuth subiodid powder and sealed with collodion gauze. Dressed with 5 per cent phenol gauze. Both legs were placed in the travois splint in extreme abduction. (Fig. 21.)

The patient made a splendid recovery from the operation, and was taken home with the splint still in place, seven weeks after the operation. He died less than a week later from thrombosis of the superior mesenteric artery.

Case VIII.—Mrs. E. I., aged 64, came to the hospital October 12, 1912, on account of fracture of anatomic neck of femur. February 3, 1912, while walking on an icy sidewalk, she slipped and fell, striking on her left thigh and hip. The pain was most severe in the middle of the thigh and she could not get up. She was taken home and put to bed. The following day she called in a doctor who said the hip was dislocated. He manipulated it for

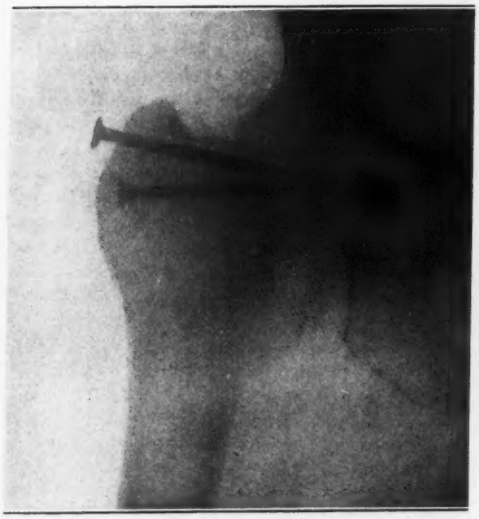

FIG. 18—Case VI. Ten weeks after operation, with bony union and bone in good condition.

FIG. 20—Case VII. Two years and four months after previous skiagram was taken, showing great absorption of neck of bone, with a button of bone in the acetabulum. This is the remnant of the head.

FIG. 19—Case VII. The fracture is not apparent in this picture because the fragments are impacted. Very little shortening of neck of femur and not slightest deviation in angle.

FIG. 21—Case VII. One month after operation. Three nails transfix the fragments. Bony regeneration progressing favorably. One nail has been driven into the acetabulum to maintain fixation. Leg is abducted.

some minutes and finally thought he had reduced the dislocation. The patient noticed that the foot was markedly everted at the time. She never had any pain directly over the hip joint. Two weeks after the accident she developed pain in the lumbar region of the spine and called an osteopath, who diagnosed a dislocation of the innominate bone. He treated her spine for two weeks with no results. Her pain now was located in the knee and foot, also a small, sensitive area on outer aspect of the thigh, half way between knee and hip. June 12, 1912, she consulted another doctor, who diagnosed a fracture of the anatomic neck of the femur. She had

FIG. 22—Case VIII. Fracture of neck of femur close to the trochanter. Head of bone in acetabulum, but rotated downward.

no pain in that region, and did not believe his diagnosis till June 18, when she had a skiagram made, which showed a fracture of the anatomic neck of the femur near the trochanter. She has not been able to put any weight on the leg since the fall, except when she has it in extreme abduction, and then only a little. There is now no pain in the foot, and very little in the knee. She had a second fall in August, 1912, when she struck this knee. It became red and swollen, but redness and swelling soon disappeared.

Examination—The foot is everted and there is 1 1-4-inch shortening of the leg. Skiagram shows a fracture of the anatomic neck of the femur and separation of the fragments. The head of the bone is in the acetabulum, but rotated downward. (Fig. 22.)

Treatment.—A longitudinal iliotrochanteric incision over the trochanter major exposed the joint. The anterior fibers of the gluteus medius were not Gigli saw and retracted as in the previous cases. The leg was adducted and rotated outward to make the fracture more accessible. Fat and capsule were cut and the trochanter was not sawed off with the found interposed between the fragments. The structures were removed and the ends of the fragments freshened. The head was in the acetabulum and alive. A bony spur, about half an inch long, on the posterior edge of the head fragment, was removed with bone-cutting forceps, so as to permit

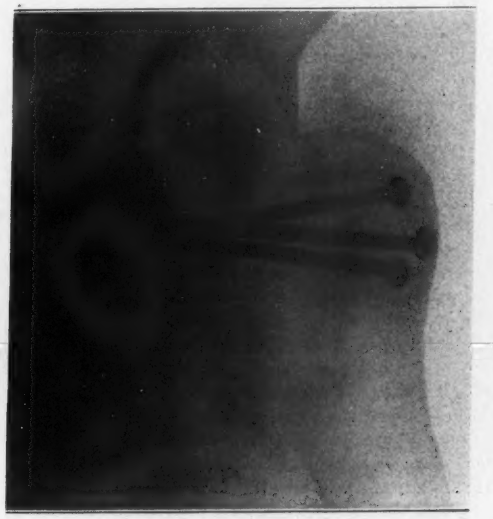

FIG. 23—Case VII. Six weeks after operation. Good position of fragments, with bony union.

of more perfect approximation of the fragments. This approximation was secured by means of two wire nails driven through the neck and head from the trochanter side of the shaft. The deeper layers of the wound were closed with a two-tier catgut suture and the skin edges were approximated with horse hair, dusted with bismuth subiodid and sealed with collodion gauze. A large 5 per cent phenol gauze dressing was applied, and the legs were then placed in the travois splint in extreme abduction. No extension. It is now six weeks since the operation, and the patient has not been disturbed and will not be for at least several weeks more on account of her age. (Fig. 23.)

Case IX.—Dr. N., aged 62, came to the hospital on account of non-union of a fracture of the neck of the right femur. January 18, 1911, the patient was thrown from his sleigh onto an icy pavement, striking squarely on his right hip. He had terrific pain in the right hip instantly and was not able to get up. He was picked up and carried to a store near by and a few minutes later to a hotel, where he waited for a car. While there he was given one-fourth of a grain of morphin for his pain and another dose while he was on the car. His foot was markedly everted from the time of the accident. When he reached home he was given an anesthetic while his clothes were being removed and he was being put to bed. The following morning he was fixed up with a Buck's extension and twenty-four-

FIG. 24—Case IX. Fracture of anatomic neck of femur, with considerable absorption of bone on shaft side of neck, and upward displacement of shaft.

pounds weight and a side weight of twelve pounds was placed to correct by outward traction the inward rotation of the thigh. He said that the ecchymosis extended from the knee upward over one-half of his trunk. Pain was constant. The Buck's extension gave him relief, but the lateral weights were painful. He kept this weight on five weeks and the Buck's extension nine weeks, and stayed in bed over a week longer, a total of ten weeks. While the Buck's extension was on this leg was about one inch longer than the other, but as soon as the extension was removed the leg got shorter and in a few days was about two inches shorter than the left leg. He has been using crutches ever since. Had massage treatment twice, but was not benefited. A skiagram was made June 10, 1912, and showed an ununited fracture of the neck of the femur, with upward displacement of the shaft. Tried building up of the shoe to meet the deficiency, but it became very painful, and he took it off. The patient has less pain since he threw away the thick-soled shoe. The pain in the knee and adductors is as bad as the pain in the hip.

Examination—Motion in the joint is free but painful. Shortening of leg of inch and a half. Skiagram shows fracture of anatomic neck of femur with considerable absorption of bone on shaft side of neck, and upward displacement of the shaft. (FIG. 24.)

FIG. 25—Case IX. Three weeks after operation, showing good approximation of fragments and fair position of shaft.

Treatment—A longitudinal ilio-trochanteric incision was made, which gave a good exposure of the fracture. The anterior fibers of the gluteus medius were not cut, and the trochanter was not sawed off. The joint was well exposed by retraction of the wound margins and of the muscles. Then ends of the fragments were covered with a thick pad of fibrous tissue, which effectively prevented bony union. This tissue was carefully removed with scalpel and scissors and the ends of the fragments freshened. The head fragment was alive. Approximation was easily made and secured with three wire nails driven through the neck into the head

from the shaft side of the femur. The capsular remnant was sutured around the bone with phosphor bronze wire. The wound in the fascia lata was closed with chromicized catgut and the skin incision with horse hair. Bismuth subiodid powder, collodion gauze and a 5 per cent phenol gauze completed the dressing. Both legs were placed in a travois splint in extreme adduction. It is now two weeks since the operation. The patient is making an uneventful recovery. (Figs 25 and 26.)

In fracture of the neck of the femur where immobilization is not maintained, the absorption of bone depends on the proximity of the fracture to the epiphyseal line between the head of the femur and the trochanter. When the fracture is at the epiphyseal line there is always extensive absorption of the neck in the distal direction, so that the neck eventually disappears entirely, as was the case in

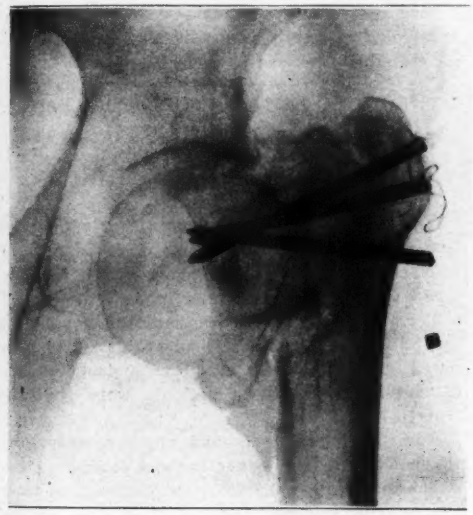

FIG. 26—Case IV. Ten weeks after operation. Firm body union has taken place.

Case IX. The absorption in this case did not take place for many months after the fracture, which was primarily an impacted fracture. When the line of fracture is at the trochanteric end of the neck there is no absorption at all, as is illustrated in Case VI.

This absorption we believe to be due to two factors—motion between the fragments, and the normal anatomic distribution of the circulation in the fragments. The vessels to the proximal portion of the cervix femoris all pass from without inward, so that when a fracture takes place near the epiphyseal line the blood supply to the proximal portion of the neck of the femur is very materially diminished, and consequently osteogenesis is retarded and osteoporosis and absorption favored. We have demonstrated this fact conclusively on the skeleton, and the observations made there sustain our clinical findings.

MANAGEMENT OF EARLY CASES OF FRACTURE OF THE NECK OF THE FEMUR.

When the fracture is an impacted one, the impaction never should be separated. The diagnosis of this fracture can be made very readily with the assistance of the Roentgen rays, and one does not need to depend on the elicitation of crepitus, which, of course, is absent in an impacted fracture. The diagnosis can also be based on careful measurement of the Bryant and Nelaton lines, and by noting the physical relationship of the ilium to the trochanter.

Of the deformities that occur in connection with fracture of the neck of the femur, one is shortening and another is rotation of the leg, either inward or outward. The rotation often turns the periosteal side of the neck against the fractured edges of the proximal fragment, and therefore prevents union. The shortening often displaces the distal fragment, so that it is on a higher plane than the proximal fragment, the latter contacting with the periosteum of the under surface of the neck of the femur, and union is prevented.

The indications for treatment are therefore (1) that the shortening should be overcome by extension in all except the impacted cases; (2) that the rotation should be overcome by holding the toes in a perpendicular position, the foot being neither everted nor inverted; (3) that immobilization should be effected so that the fractured fragments be pressed into each other by superlative abduction of both legs, which is secured by putting the patient into the travois splint. By means of this superlative abduction all of the adductor muscles, fascia and capsular ligaments are utilized to force the distal fragments firmly against the proximal fragment and to keep it there constantly during the process of repair. At the same time the traction of the trochanter major group of muscles is overcome by the relaxation produced in them by this superlative abduction. This position must be maintained constantly and uniformly throughout the entire course of the process of repair.

We have observed clinically that absorption of the neck does not take place when immobilization is made effectively and continuously, so that the contracting of the fractured surfaces is maintained. The long external splint, with or without extension, the ordinary Thomas splint, the Maxwell-Ruth splint,

do not fulfill the indications of proper management of fractures of the neck of the femur.

The plaster-of-Paris cast, including both hips with abduction of both legs, meets the conditions in impacted fracture of the neck, but it is very inconvenient to the patient. The so-called "railway splint" is likewise deficient. While most of these splints are worthless in the management of these cases, yet sometimes, notwithstanding their defects, it is possible to secure union of the fragments with their aid.

But no splint, even with extension, abduction or sidewise traction, can secure union of the fragments when there is interposing between them capsule or other soft tissue. We made that observation in four successive operations done for ununited fracture of the neck of the femur. In some of them the interposition of soft tissue can readily be recognized in the skiagram, while in others it is impossible to detect it.

The amount of weight attached to the extension apparatus placed on the limb must vary with the muscular development of the individual patient. As a rule, it should range from 15 to 35 pounds. To attach a 10 or 15-pound weight to the leg of a muscular patient is of absolutely no value whatever. It is a delusion.

The best plaster to use for the extension is the old-fashioned diachylon moleskin plaster, which was in use thirty years ago, before the rubber adhesive plaster was invented. The rubber adhesive plaster has the disadvantage of producing an eczema, and sometimes it causes blisters to form. The diachylon plaster never does this. It can be left on until it falls off without causing the patient any discomfort whatever.

It is fitting that we should here sound a note of warning in applying the Buck's extension, namely, that the external popliteal nerve, where it passes around the neck of the fibula, from behind forward, should be freed from all pressure by bandages or cast, if one is desirous of avoiding the characteristic drop-foot paralysis, which is caused by pressure on that nerve. In all cases in which we apply a plaster cast to the leg, including the head of the fibula, we always cut out a window over this bone, so that there will be absolutely no pressure on the nerve. This drop-foot paralysis is often more annoying to both patient and surgeon than the original lesion. There is no reason why it should occur; it can very easily be avoided.

In from eight to sixteen weeks, in adults, bony union will take place between the fragments of the neck of the femur; in children from five to eight weeks are sufficient to produce firm, bony union.

If the principles outlined above are effectively applied we will have a smaller number of fractures of the neck of the femur coming to the surgeon for treatment months or even years after the primary injury has occurred, although we will always have failure of union on account of the interposition of soft tissue between the fragments, no matter how effective the primary treatment may have been.

However, the surgeon must be master of aseptic technic, because otherwise infection will take place. In all of our bone and joint work we never allow any instrument or sponge or even the gloved hand to come in contact with the skin. Nor are the working parts of the instruments touched by the gloved hand. The scalpel which is used to make the skin incision is discarded and a fresh one used for incising the deeper structures. The edges of the incision are overlapped by sterile towels, which are held in place with towel forceps. Sponges are passed in and out, never being used a second time, and not coming in contact with anything in their passage. It is only by observing these details of aseptic technic that this work can be done effectively.

A THEORY OF THE ETIOLOGY OF PELLAGRA.

By T. Latane Driscoll,
Cartersville, Ga.

It has been interesting to note that within the last two years several cases of pellagra have been seen in which the emphatic statement was made that all cornmeal was made by the local miller. This corn was grown, matured and shelled by the individual, that all bad grains were eliminated, such as appear at either ends of an ear of corn, and yet these patients were suffering from pellagra.

Now, this meal is ground much coarser than the meal from the larger mills, allowing all the cellulose or external capsule to be removed from the meal by "sifting" and, too, it is a well-known fact that practically all of the shipped meal has been bolted, thus eliminating almost every vestige of cellulose, leaving only the glucose of the individual grain. The question will naturally be asked, how about Italy for the past hundred years? I am informed by reliable Italians that so much opposed are they to bran that they "sift" their meal three and four times. I do not wish to be entirely antagonistic to my fellow workers, and I would say by all means omit spoiled maize from the dietary because in that event the external capsule is certainly injured, and perhaps the glucose and sperm in reasonably good condition.

The absence of this covering is what I believe

to be the factor involved in the production of pellagra. This capsule contains a hormone or some complex chemical compound that is necessary in the maintenance of nerve equilibrium and stability. As for instance, rice polishings in beriberi. With reference to seasonal incidence, we believe that the actinic rays of the sun are necessary to bring about the lesions on the extremities, trunk, etc. The exclusion of light, therefore, will retard the development; thus I saw a lady eight months pregnant with classical symptoms of pellagra exclusive of skin manifestations. She had remained indoors during the entire eight months, and after delivery and consequent outdoor life, developed a bisymmetrical erythema, and died a few months later. In winter our patients remain indoors, and are less exposed, and, too, there is much less light in winter than summer. It will therefore follow that springtime, the most attractive season, will find all out of doors constantly, with unlimited exposure, thus favoring development.

To enumerate briefly, I believe pellagra to be due to absence of a hormone or a chemical substance in the grain capsule, and the omission of this from the dietary of the cornbread eater, by artificial means, is responsible.

The following work has been done in corroboration of this theory: Chickens fed on corn with the covering removed developed manifestations on legs similar to pellagra in man. Chickens fed on bran only develop same condition as those fed on corn exclusive of bran. Feeding whole grain intact will cause disappearance of lesions in about three weeks.

Case 1.—Woman with pellagra for one year. Fed on cornmeal with half volume of bran; lesions disappeared entirely within three weeks with slight soreness of mouth and subacute gastritis remaining.

Case 2.—Man with history of disease for three years, marked erythema of hands, diarrhoea, pronounced glossitis and gingivitis, mental hebetude, with occasional hallucinations. Four weeks following, no erythema, no diarrhoea, gained ten pounds, mind cleared up.

I am indebted to Dr. D. H. Monroe, of Emerson, Ga., for the following cases, upon whom he kindly used bran as in cases as above.

Case 1.—Pellagra for five years. Milk sugar placebo and unsifted meal plus bran. No lesions on hands, no diarrhoea, mind clearing up and gaining weight after three weeks treatment.

Case 2.—Patient twelve years old; has had pellagra for one year. Marked lesions on hands, diarrhoea, mental abberation, much emaciated. Treated as in case one; gain of from one to three pounds per week, with disappearance of all pellagrous manifestations.

CLINICAL NOTES ON UTERINE HEMORRHAGE.*

By Hubert A. Royster, A.B., M.D.,
Raleigh, N. C.
Surgeon to Rex Hospital, Surgeon-in-Chief to St. Agnes Hospital.

There is hardly a malady which is so generally misunderstood or so badly managed as bleeding from the female genitals. Upon the average physician, when confronted with the condition, there seems to settle a spirit of carelessness—a spirit which is less excusable than absolute ignorance. Many medical men act as if they consider it the common lot of women to bleed, and do not take really serious interest in such cases. Women themselves, as a consequence, do not regard the matter with sufficient concern. The "change-of-life" fetich is still making invalids and destroying lives. Faulty teaching is largely to blame for this attitude; the kind of teaching which overlooks the substance for the form, which fails to see the importance of clinical study and experience.

It is not scientific to discourse upon a symptom; but it is the symptom we meet at the bedside. One should never under any circumstances attempt to treat hemorrhage from the uterus until a conscientious effort is made to find its origin. There is a cause for each pathological issue of blood from the pelvic organs, if we only discover it. First, make sure it comes from the uterus. I have known bleeding from a urethral caruncle to be mistaken for uterine hemorrhage; ulcerations and growths of the vulva or vagina, or rectal affections may be similarly confused.

Such errors cannot occur in the face of a careful examination, which must be the first thought. Practitioners are prone to wait, thinking it improper to examine a woman while she is bleeding. There is no reason for putting it off on that account. Sometimes the source of the bleeding is more certainly ascertained during the flow. In some cases it would be hard to find a time during the attendance when the woman was not bleeding, and an indefinite postponement would result, if one should wait for a dry interval. The examination should include a general survey of the patient, a systematic search of all the organs, as well as those in the pelvis.

*Read by title before the Southern Medical Association, Jacksonville, Fla., Nov. 12-14, 1912.

The terms menorrhagia (excessive bleeding at the periods) and metrorrhagia (bleeding between periods) are often indefinitely employed. The conditions occasionally shade into each other, because of the irregularity of the bleeding, or the long-drawn-out periods; or because, for example, an affection may first produce menorrhagia, then gradually come to a metrorrhagia, which may be its specific symptom.

Bleeding of the uterus may be due to general or local causes. General causes are those which relate to conditions outside the pelvis. Most common among these are (1) **the blood dyscrasias**—various forms of anemia, purpura and scorbutic affections; malaria; syphilis; pellagra; (2) **heart, kidney or liver diseases**—from passive congestion; (3) **alcohol addiction**, rich feeding and high living. It is only necessary to remark that, if any of these affections are considered to be the causal element, proper treatment should be instituted. Particular attention must be drawn to pellagra as a cause of uterine hemorrhage. Many cases show this symptom in the early stages before the disease can be clearly recognized, and one should, therefore, be on guard. Dr. C. H. Peete, of Warrenton, N. C., has written timely on this question; his observations are thoughtful and sound.

Fig. 1. Age 46. Treated with drugs for years and curetted twice. Menorrhagia. Submucous fibroid.

But in no case must one neglect to examine the genital organs, to discover if there may not be a local cause, in addition to, or instead of, the general cause. There may be indications pointing to a regional origin of the bleeding, as pain, or pressure, or the presence of a mass. Such a suggestion may be given by the patient herself. Prominent as local causes of hemorrhage from the uterus are the following:

1. Under the first heading are included **endometritis, retroversion and cervical laceration,** these being most often associated. The type of hemorrhage from all three of these lesions is that both of menorrhagia and metrorrhagia, with variations from time to time. There is much confusion in regard to endometritis. Very probably it does not exist except as an infection, and it is not often alone the cause of uterine bleeding. The interstitial form, and especially the fungoid variety, has been supposed to figure largely as an etiological factor; but in some cases, at least, the condition has turned out to be, not an endometritis, but a new growth. Such findings emphasize the suggestion to look upon the endometrium as a gland, and not as a mucous membrane. (Fig. 1.) Retroversion of the uterus presents a local passive congestion. It is not of itself usually the causative agent in severe bleeding. Laceration of the cervix, with its consequent endocervicitis and erosion, is of far greater importance as a cause of bleeding than the other conditions named. Metrorrhagia is the rule, but the periods are always more profuse. The futility of administering drugs to contract the uterus, when the bleeding is due to a torn and everted cervix, is readily appreciated.

2. **Uterine Fibroids,** the most common tumors of the uterus, are, of course, recognized as being responsible for a large number of cases of uterine hemorrhage. The type of bleeding is menorrhagia, though in some severe instances the patient is rarely free from a flow of blood. In a sterile woman under forty years it is a natural presumption to think of a fibroid. But many times mistakes will be made. The size of the tumor has nothing to do with the amount of blood. The largest masses often show no hemorrhage, especially if they are entirely subperitoneal; while a small interstitial nodule near the uterine cavity or an insignificant polyp may give rise to profuse floodings. The nearer the tumor to the endometrium the freer the bleeding.

These growths are often overlooked. There is no way of certainly determining the presence of a small fibroid in the wall of the womb, and the discovery is sometimes made after a hysterectomy for intractable bleeding of supposed unknown cause. The same operation may reveal a submucous tumor and result in cure of the patient after repeated curettements had failed to remove the

growth. (Fig. 2.) Such a failure may have been due to the fact that the fibroid was just in transit from an interstitial to a submucous form, and was more or less fastened in the uterine tissue.

Furthermore, patients with fibroids are often neglected. Even in this age of widespread information, physicians are waiting and watching for the menopause to stop the growth of the tumor. In the meantime, women, sometimes young women, are allowed to go on bleeding, hoping for the "change," which may never appear, or to become exhausted and unfit for receiving the benefits of deferred attention. The well-known relation between fibroid and cancer of the uterine body stands as an earnest exhortation for early operation in all cases. The connection between the two is not that of carcinomatous degeneration of the fibroid, but development of cancer in the endometrium as a result of lessened resistance from irritation by the fibroid. A bleeding fibroid must be removed.

3. **Carcinoma of the uterus** is a cause of hemorrhage. Since the bleeding is due to ulceration and breaking down of tissue it is characteristically a metrorrhagia; though there is in the beginning an increase of the regular menstrual flow. The hemorrhage varies somewhat as to whether the cancer is in the cervix or the fundus, that from the cervix being more profuse and more easily started by a douche, examination or coitus. In either instance the blood usually issues at irregular intervals, coming and going unexpectedly. Carcinoma of the corpus occurs in older women than does cervical cancer. Fibroids, too, sometimes persist in elderly women, particularly those who have been sterile or relatively so—that is, those who have had one or two children followed by a lengthy period of barrenness. A concealed fibrous nodule would be difficult to distinguish from a cancer in the uterine body, and microscopic examination of the scrapings only could decide in most cases. The type of bleeding should receive consideration.

4. An important pathological condition back of many cases of bleeding from the uterus is **salpingitis**, a chronically inflamed tube of normal size up to a large pyosalpinx. This is not always thought of. An abundant menorrhagia, with "spells" of tenderness in the lower abdomen is the usual condition, and the diagnosis of fibroid is often made. Both conditions are ordinarily associated with sterility. Primarily an infected endometrium is responsible for the bleeding, but curetting is inadequate for permanent relief, and dangerous unless the damaged tubes be extirpated at the same time. Hysterectomy will be demanded in the vast majority of cases, as the tubal infection is more frequently bilateral. By far the larger portion of my pus-tube cases exhibit marked uterine bleeding. Yet I am satisfied that sufficient emphasis has not been given to this as a cause. Its frequency should be an eternal warning against a uterine curettage to stop bleeding without a careful history and a thorough bimanual examination.

5. **Abortion, miscarriage** and their **remote results** are always to be suspected when a uterus is bleeding. The history may be misleading, or even purposely deceptive. In the presence of an active effort of the uterus to unload itself, or the retention of secundines from a recent abortion,

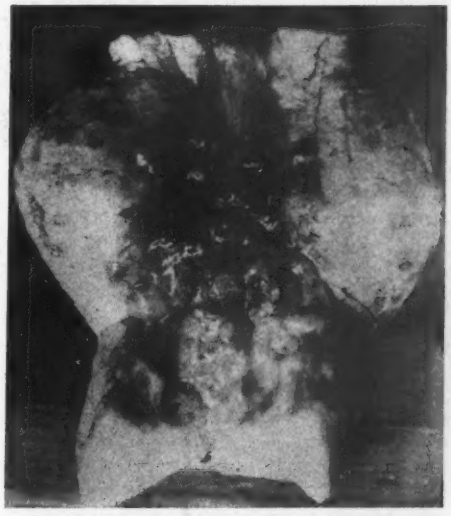

Fig. 2. Age, 42. So-called "fungoid endometritis." Pathological report. "Adenomyoma." Menorrhagia, bleeding spells lasting as long as five months.

the arrest of hemorrhage is usually a simple matter, and no rules need here be laid down for it. But there are many cases of long standing and constantly recurring hemorrhage which are due to old miscarriages, perhaps unrecognized, and these are not so easily mastered. In two cases of my own, removal of the womb, which had to be done as a last resort, revealed an organized mass of placental tissue which had firmly planted itself into the uterine wall. (Fig. 3.) Repeated curettements did not reach this mass, as it will not in a similar condition. Only a hysterectomy would suffice.

6. **Tubal Pregnancy.**—In every instance of uter-

ine bleeding a possible ectopic gestation must be suspected. The condition may be an acute hemorrhage at the time of rupture, or the more confusing and frequently neglected hemorrhages which occur irregularly afterward. Miscarriages are too often the only thought, and hundreds of uncalled for curettings are done. The history is the thing—not, perhaps, as the text-book would have it; but careful inquiry will generally bring out some clue to work on. Always look for tubal pregnancy, especially when you do not believe it is present.

7. For want of a different name it may be mentioned that the so-called **arterio-sclerosis of the uterus** has lately assumed importance as a cause of uterine hemorrhage, particularly about the climacteric. Most likely it is not an arterial atheroma in the majority of cases, but, at least in some, an increase of the elastic fibres around the blood vessels. The uterus may be flabby, or it

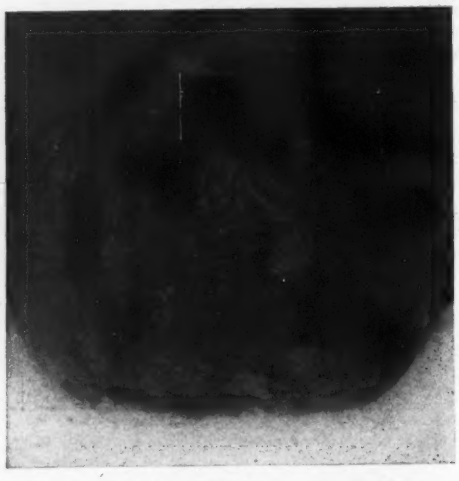

Fig. 3. Age 40. The tissue attached to endometerium is placental. Bleeding profusely for weeks. Abortion four years before. Cervix amputated at another hospital a year previous.

may be very hard. All sorts of pathological conditions have been described under the same clinical group, and it is probable that different types of lesions may give rise to similar symptoms. This much seems established, viz: that there is a lack of proper uterine contraction; that there is an increase in the number and size of blood vessels, and that there is a development of fibrous and elastic tissue from subinvolution. (Chalfant.) Clinically we find that women with this condition have been subjected to rapid and long-continued child-bearing, and that the bleeding is profuse and not easily controlled. For a permanent cure hysterectomy is required in almost all of the cases.

The **handling** of a case of bleeding from the uterus calls for exercise of the soundest judgment. Treatment may vary from the use of the simplest remedies up to the most radical operative procedures. Certainly no one can be so rash as to think that every case ought to be subjected to operation, nor should one fail to see the need of operative interference early when indicated. Of the treatment of the general diseases associated with uterine hemorrhage, nothing will be said and enough has been written of the pelvic lesions to indicate the specific treatment under each head.

In any case drugs and local measures are demanded temporarily to stop bleeding in a sudden emergency, or to tide over until some operation may be done in the interval. Ordinarily interference is not indicated during a bleeding period, but one should not let the hemorrhage stand in the way, if the operation is urgently needed, or if the hemorrhage cannot be checked by any other means. Above all one ought not to attempt too much "building up" in the face of constantly recurring hemorrhage, only to have it all to go over again and again. It were better to operate first and build up afterwards.

At times it is absolutely imperative to do something immediately to arrest hemorrhage from the uterus. It is very rare to see a woman bleed to death from this cause, but many have alarming and exhausting turns from it. Packing the vagina or the uterus is usually practiced, and is in most instances successful, but in my opinion it should not be routinely or continuously employed. It gives a false sense of security. Hot vaginal douches are sometimes very much better, and direct applications to the endometrium far preferable in urgent cases. When the origin of the bleeding is found, then the proper remedies can be applied.

The most abused drug is **ergot.** Practitioners have largely got into the habit of feeling that because they have uterine bleeding therefore ergot must be given. I think all physicians will agree with me that ergot in most cases does no good, and in many cases does harm. In numbers of instances one can see after later investigation why the drug really increased the bleeding. It should not be the first thought in hemorrhage. It is especially useful only in those cases in which we desire strong uterine contraction, and by far the larger number do not call for this, but would be made worse by it. How foolish, then, to ad-

minister ergot until the cause of the hemorrhage is ascertained! Ergot has its indications and serves a good purpose when used intelligently, but its indiscriminate exhibition is harmful in the extreme.

Hydrastis is the most widely applicable remedy in uterine bleeding, because it contracts blood vessels gradually and surely, without disturbing the muscular wall of the uterus. In the form of the fluid extract or as its alkaloidal salt, hydrastinine hydrochlorate, this drug may be administered over a long or a short period with confidence. In a continued hemorrhage with exhaustion of the patient's nerves **cannabis indica** has a steadily favorable effect. One does not fully appreciate this remedy until it has been tried in suitable cases time and again as an aid to other drugs and remedial measures. All of these therapeutic means are to be prescribed judiciously, and judiciously discontinued when the time comes to stop them. Some cases do better when nothing is given. I have seen women who were bleeding continuously under a set course of treatment recover immediately and permanently upon a simple tonic mixture; which goes to show that the cause was not clearly known.

THE REPORT OF TWO UNUSUAL CASES OF NASAL POLYPUS, OCCURRING IN SISTERS, WITH THE RESULTS OF OPERATIONS.*

By Charles W. Kollock, M.D.
Charleston, S. C.

These very unusual and exceedingly interesting cases were first seen by me about six years ago, but did not come under my care until some time later. At that time they were nine and twelve years old, and had been affected for two and four years respectively. Their histories are briefly as follows: The elder, when five years old, was found to have catarrh of the nose and soon after the growths were discovered in the nose. At the age of seven the younger became affected in the same way. Previous to these periods they appeared to be in fairly good condition, and, so far as I could ascertain, the other members of the family were in good health. The appearance of these girls was such as to attract the attention even of the laity. Their noses were unusually broad and flat at the roots and this increase of width extended to within a short distance of the tips, which were narrow and pointed. The mouths of both were habitually open and their expressions were dull and listless. The flattening of the noses had been caused by spreading and thinning, but not by separation of the nasal bones. The measurements between the pupils and between the canthi were unusual for their ages. In the younger the pupillary distance was 63 mm., the canthal 45 mm., and across the nasal bones 42 mm. In the elder the pupillary distance was 60 mm., between the canthi 46 mm., and across the nasal bone 48 mm. The average pupillary distance for children of their ages would be from 53 to 58 mm. At times the eyes were watery and the conjunctiva congested, still there were no signs of stoppage in the nasal duct, though it is strange that it did not occur. The elder girl was of average intelligence, while the younger was unmistakably dull and always dependent upon her sister in various ways (such as in dressing), and inclined to be irritable. From a distance of twenty feet, or more, the polyps could be distinctly seen projecting from the noses and a closer examination revealed the unusual condition of the nasal chambers being literally stuffed with them. Before coming under my care both had been operated upon several times, but with only temporary relief, as the growths returned rapidly after each operation. I declined to treat them unless they were placed in the hospital where more thorough work could be done, and not until a year after I first saw them did the father consent to this. Under chloroform anesthesia I did what seemed to be a most thorough operation upon each. It consisted in snaring and curetting the growths from the nostrils, opening and curetting the antra, breaking down and curetting the ethmoid cells, and very carefully entering and curetting the sphenoidal sinuses. Large masses were removed from the noses and the hemorrhage was profuse, but easily controlled without packing. They returned home after remaining in the hospital for a few days. Douching, which was the only treatment that could be carried out, was done twice a day with a quart of saline solution. They were brought back in about a month's time in practically the same condition that I first saw them, that is, both noses packed with growths. I then informed the father that only from the most radical treatment could any real benefit be expected, and urged that they should again be placed in the hospital in order that Killian's, or a similar operation might be performed. In the meantime the growths were removed through the nostrils on several occasions. In August, 1910,

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permission was finally obtained to operate upon the younger, whose condition was the worse, as she was becoming duller and deafer, and as she had never learned to blow her nose, it was very difficult to clear it of the large quantity of very ropy, mucopurulent excretion that constantly collected there. It was decided to perform Killian's operation as the one most likely to fit the case. An X-ray examination would have shown that the operation as a whole was unnecessary, for when the opening was made into what should have been the frontal sinus it was found to be the cranial cavity, and while it was very mortifying to have made such a mistake, no harm resulted. The sinus either did not exist or was so small that it could not be found. It was not necessary to remove the turbinate bones (middle), for all had been destroyed by the pressure of the growths. Through the opening in the side of the nose the growths were plainly visible as they lay matted together, and it is hard to conceive how such small spaces could accommodate such masses as were removed. By breaking through the upper portion of the septum it was found that the cavities of the opposite side could be easily reached and treated without making another external opening. The growths seemed to spring principally from the antra and the ethmoid cells, and though large openings were made through the nasal walls of the former it was most difficult to free them of the polyps. The nasal bones were as thin as paper and on this account it is possible that the deformity might be greatly lessened by breaking and remolding them into better shape. The hemorrhage was profuse during the operation, and though the nostrils were tightly packed, it continued until the next day, when the packing was removed and it suddenly stopped. It is now two years since this operation was performed, and there has been no return of the growths, but there is still a thick and tenacious mucopurulent discharge. The girl has grown rapidly, the hearing has improved markedly and her mental condition is wonderfully better. The opening that was made through the upper portion of the septum has evidently closed, as it could not be found. About a year later a similar operation was done upon the elder sister, except that the opening was made through the side of the nose as is done in the lower portion of Killian's operation. Large masses of polyps were removed from both sides (including the antra and ethmoid cells), and the opposite side was entered, as in the first case, through the upper part of the septum. The result in this case has not been as good as in the first, as the growths have returned to some extent, but not as bad as formerly.

A third case of this kind was brought to me during the last year, but the conditions had not existed as long nor were they as serious as those of the sisters. However, there was a considerable deformity of the nose and both nostrils were packed with the polyps, which seemed to spring especially from the antra. The same operation was performed upon this patient, and when seen several months later there was but a slight return of growths. The photographs of the sisters, which are being passed around, are good, but do not convey an accurate idea of the great deformity which exists. I am inclined to think that the polyps involved principally the antra and the ethmoid cells and, perhaps, the sphenoidal sinuses, but not the frontal. From my experience with these cases I am convinced that only by the radical operation can any real improvement be expected, and that the opening on the side of the nose below the inner canthus is indispensable for the thorough removal of the growths. Also that the opposite side of the nose may be reached and treated through an opening made high up in the septum which obviates the necessity of another external wound and simplifies the operation. It is doubtful whether cases of this kind can be cured, especially when they have existed for some years, but they can undoubtedly be greatly improved and the patient rendered much more comfortable by the operation. A microscopic examination of the growths removed from the sisters showed them to be fibromyxomata, and it is reasonable to suppose that they were the same in the third case, of which, through oversight, no examination was made.

DISCUSSION.

Dr. J. W. Jervey, Greenville, S. C.—I had the opportunity of seeing these cases some three or four years ago, and they presented a truly remarkable appearance. The photograph does not begin to show the amount of deformity as I recollect it. A year ago I reported a case at the meeting of the American Laryngological, Rhinological and Otological Society, and, while not wishing to throw any aspersions on Dr. Kollock's photograph, I wish to say that the deformity in my case was four or five times as great as in his cases. My case was one of long standing, in a man fifty-four years of age, with a sarcomatous tendency in the growth. By complete removal of the growth and removal of the entire middle turbinate the process was checked, and the man has been free from any return. I am surprised, as Dr. Kollock's cases were of so long standing, that the microscopic examination showed no tendency to break down into malignancy.

Dr. Feingold: Was your tumor a fibromyxoma?

Dr. Kollock: Yes, it was a fibromyxoma.

Dr. Feingold: If there is no further discussion, Dr. Kollock will close.

Dr. C. W. Kollock, Charleston, S. C., closing the discussion: I have not much to add, except that the remarkable thing is that these cases should have occurred in sisters; and also that an important point in treating cases of this kind is that they should be treated not only through the natural openings, but also through an opening high upon the side of the nose. The latter is an important adjuvant to the operation. This opening was large enough for me to put in my little finger and feel the entire area of the cavities of the antrum, which gave me a much better idea of the situation than I should have obtained if I had had to operate from below; and, having the two openings, it was much easier to work around and free the nasal cavities of the growths. To one who had not treated a case of this kind it would not seem difficult, but several times after I thought that the cavities were clear of the growths, the introduction of the finger proved that more had dropped into the places of those that had been removed. It seemed an unending job to get the cavities thoroughly clear.

THE BACTERIOLOGY OF EPIDEMIC COLDS.*

Dr. S. L. Ledbetter,
Birmingham, Ala.

For many years we have had in our community, and in other communities, epidemics which we have called lagrippe for want of a better name. The chief characteristics of these epidemics have been head colds, sore throats, tonsilitis, laryngitis, tracheitis, with accessory sinus and middle ear inflammations as complications.

These epidemics vary a good deal at times in some respects, such as manner of attack, location and severity of attacks, extent of tissues involved, etc. In some epidemics we have all of these types represented. Sometimes the symptoms are largely local, with very little or no constitutional disturbance, while in other cases the constitutional symptoms are all out of proportion to local manifestations. Sometimes with only a slight sensation of cold, or mild form of acute rhinitis, we get terrific supra and circum-orbital pains, or an acute otitis media, while in others the rhino-pharyngeal symptoms may predominate, or the attack may start with a tonsillitis followed by general pharyngitis and suppurative otitis, etc. Sometimes as acute otitis media with a chill is the first notice the parents have of trouble, when after a short, sharp paroxysm of pain the drum ruptures, or is excised by the physician and the trouble soon subsides. In other cases the symptoms are much more virulent and persistent, terminating eventually in recovery uncomplicated, or in a mastoiditis, etc.

The observation of these peculiarities and variations characteristic of cases in the same or different epidemics led me last year to make bacteriologic examinations in a few of my cases with a view to the determination of the type of bacteria, and to arrive, if possible, at a correct diagnosis of the cases. These few cases, I think, can be put down as typical of all. In some of them vaccines were made and used to advantage.

Case One.—J. P. L., age 36, began with a tonsillitis. Smears showed staphylococcus aureus. Five days later followed a general pharyngitis, which extended into the nostrils and eustachian tubes with severe deafness in right ear and partial deafness in left. Cultures taken from the nasal secretions showed the pneumococcus and micrococcus catarrhalis, from which vaccines were made, mixed with the staphylococcus from the tonsillitis cultures. Three injections of the vaccine at intervals of one week relieved all the symptoms.

Case Two.—J. P. L., Jr., age ten months. Acute general pharyngitis with small ulcer in left tonsil. Culture from the tonsil showed pure Friedlander pneumobacillus. Five days later otitis media occurred in both ears. Both drum membranes were incised and free drainage established. A vaccine was prepared from the culture taken from the throat. Three injections were given at intervals of five days; some reaction following the second injection; the third was reduced. Rapid and complete recovery at the end of the second or third week.

Case Three.—E. W. R. Acute bronchitis. Examination of sputum showed Friedlander baccilus, from which a vaccine was made and one injection of ten million bacteria given as an initial dose. The reaction was so considerable that the patient would not consent to a second injection.

Case Four.—I. C. S., Jr. Acute rhino-pharyngitis. Culture from the throat showed a mixture of staphylococcus aureus and albus. No vaccines were made in this case; the usual local and constitutional remedies being resorted to. Recovery uneventful.

Case Five.—H. G. W., age 40. Acute rhino-pharyngitis with no tonsil involvement. No accessory sinus nor middle-ear trouble. Some tubal engorgement. Culture taken from the nose showed a bacillus resembling the diphtheria bacillus and classed pseudo diph. bacillus, and a large diplococcus, which was not classified.

*Pead at Sixth Annual Meeting of the Southern Medical Association, Jacksonville, Fla., November 12-14, 1912.

Case Six.—Mr. B., age about 40. Employed in a railroad office. Acute rhino-pharyngitis, rather mild type, with otitis media in one ear. Did a paracentesis. Some tenderness over the mastoid. Took culture which showed staphylococcus and pneumococcus. Vaccine was prepared and three injections made. Case under treatment nearly four weeks. Discharge lasted about three weeks. Recovery complete.

Case Seven.—Miss B. S., a stenographer, age 20. General rhino-pharyngitis; pus flowing from ethmoid cells, beginning in left nostril, and later extending to right. Secretion from cells very free, and during the acute and early stage severe supra and circumorbital pains on both sides, sufficient to keep the patient in bed for a few days. These were relieved by free hot nasal irrigations and the administration of capsules containing aspirin, antipyrine and caffeine citrate. Pus from nose showed Fraenkels pneumococcus prevalent.

Case Eight.—Mr. R., a railway conductor. Rhino-pharyngitis, left otitis media, cat. acuta. Did paracentesis. Smears from the secretion from the ear showed a diplococcus, which was difficult to identify; not very numerous, possibly due to the fact that bichloride solution was being used freely in dressing. Extremely painful for two weeks. Rapid recovery.

Case Nine.—Mr. B., an accountant, age about 40, a hay fever subject, but not suffering from hay fever at this time. The symptoms were those of acute rhino-pharyngitis with pus flowing from the ethmoid cells. The patient complained of severe orbital and supra-orbital pains. The smears in the case showed only a small number of bacteria, Mic. Cat. prevailing. Recovery prompt.

Case Ten.—Mr. F., a carpenter; had a severe general rhino-pharyngitis, with otitis media sup. in both ears, and more or less involvement of all the accessory sinuses. Patient confined to bed for two weeks or more; right ear discharging when seen by me first; left ear giving excruciating pain, which was relieved by paracentesis. Case treated by usual methods. Mastoid and frontal pains. Secretion from ear showed micrococcus catarrhalis with pneumococci.

Case Eleven.—Dr. L., age 36; began with symptoms of cold in naso-pharnyx. Smears showed Fraenkel's pneumococcus and Friedlander's pneumobacillus. A mixed vaccine was used in this case, and the cold was aborted. The vaccine in this case contained Friedlander's pneumobacillus, Fraenkel's pneumococcus, micrococcus catarrhalis, and staph.-aureus.

The following bacteria were found in the eleven cases examined: Staphylococcus aureus, pneumococcus, micrococcus catarrhalis, Friedlander's pneumobacillus, mixed staphylococcus aureus and albus, pseudo diph. bacillus, a large unclassified diplococcus and diplococcus lanceolatus.

DISCUSSION.

Dr. J. W. Jervey, Greenville, S. C.—I have had very little experience with the use of the autogenous vaccines; but, while this has no distinct bearing on these views of Dr. Ledbetter's, I have had gratifying results in a small number of cases with the use of the autogenous vaccines. I formerly tried the stock vaccines, and found them of absolutely no use, but the autogenous vaccines were of great benefit and gave good results. Along the line of the rhinitis cases a mention should be made of hay fever cases. An investigation of these would have great scientific interest. During the hay fever season last year I determined that it was possible that the deposit of foreign substances of some sort in the nasal mucosa was to be discovered by microscopic examination, and I had a number of cultures made from the secretions of those patients who had typical hay fever cases. My conclusion was that the irritating substance was in the form of an organism, and that the nose reacted to the irritating organism. Therefore, I contended that if we could establish immunity to this organism, no matter whether we had a neurotic condition or not, we might be able to break up the hay fever attack by destroying the third leg of the argument, so to speak. These cases showed a wide variation in the microscopic finding, but all had certain pathogenic germs that I felt that it might be worth while to immunize the patient against in an effort to see whether there was any connection between them and the hay fever condition. Each patient had several injections, starting at one hundred million dead bacteria and going up to five hundred million; and in every case the patient recovered rapidly. I do not mean to say that this was an instance of cure. I do not wish it understood that I claim to have positively cured a hay fever patient by the use of autogenous vaccines, but nothing is impossible, and with this evidence at hand it might be worth while for all of us to make an effort to get at the bottom of this matter by using hay fever patients for experimental purposes in this direction.

Dr. Feingold.—Is there any further discussion? If not, will Dr. Ledbetter close?

Dr. Ledbetter.—I have nothing to say.

THE AFTER-TREATMENT OF CASES OF RADICAL OPERATIONS IN OTO-RHINOLOGY.

J. A. Stucky, M.D.,
Lexington, Ky.

The suggestions which I am about to make are the result of lessons learned in an active practice in oto-rhinology for more than a quarter of a century. These lessons in major surgery are learned from more than 500 mastoid operations, fifty-nine

intra-dural abscesses, 160 Caldwell-Luk operations upon the maxillary antrum and probably more than 1,000 middle turbinectomies, in which perhaps 50 per cent of the ethmoid cells were removed.

I make no apology for reading a paper upon this topic. It is not intended so much for publication as for discussion. It is for those of us in the South living in the smaller towns and cities, far from the large clinics in metropolitan cities, which are conducted by a number of our ablest men of large experience and great ability who come in daily contact and consultation with each other, who are protected and assisted in their work by city, State and the hospital clinical laws. Their indigent clientele are fed and clothed and the clinicians furnished without financial cost every facility and aid for their work. Not only are the hospitals the best equipped, but the nurses are the best trained and in the largest number. The clinical and laboratory reports and after treatments of each case are carefully kept by well-trained internes and house surgeons.

Those of the Southland do not have these facilities, protection and opportunities. On the contrary, many of us have meagre facilities, few opportunities for consultation and observation of other men's work, and our indigent clinical cases frequently cost us money, time and opportunity. In all my experience in oto-rhinology I have never had but three cases of thrombosis of the lateral sinus and have never ligated or removed the jugular vein. My scientific curiosity on more than one occasion has gotten me into trouble, not serious, but annoying. My over-anxiety in certain cases on more than one occasion has overbalanced my judgment and I have trusted too much to science and self and not enough to nature, and this experience has taught me as many things to avoid as it has taught me things to do.

All of us acknowledge a great debt of gratitude to our brother practitioners of the large medical centers whom many of us regard as Gamaliels in oto-rhinology and it is because of the presence of some of them with us today that we want to discuss this topic and have them tell us wherein we have fallen short. The things that militate against satisfactory results in all surgery are:

1. The incomplete operations.

2. The lowered power of resistance of the patient as the result either of delay in having the foci of infection removed or else whose recuperation has been retarded by a lowered body resistance as the result of auto-toxemia, or shock from too profound and long-continued anesthesia.

3. The too long-continued dressing of heavy, uncomfortable material, which by the heat and moisture favor formation of exuberant granulations and lower the vitality of the external parts.

4. Imprudence in diet immediately following the operation and insufficient rest of mind and body.

By the incomplete operation I mean we fail to thoroughly remove the foci of infection and establish unobstructed drainage and ventilation. In oto-rhinology ventilation is as necessary as drainage, and herein lies the difference between this and surgery of any other part of the body. There is a tendency to do an over-complete operation by removing tissue not involved beyond restoration by the pathological process. A complete operation does not require that we chisel, curette, drill and polish the operated area till it shines like a china teacup. Such a procedure is detrimental in that it prolongs the operation unnecessarily and greatly retards the process of healing by granulation and dermatization.

Years ago I was taught this lesson by Gustav Killian, who at my request criticised my method of doing both the radical and classical mastoid operation. He said: "You vas vell finished with the operations before you quit. Such a fine polish of the bone is not necessary." The honest, candid criticism was a valuable lesson to me. Do a complete operation, but do not over do it. Where the body resistance is lowered by sepsis and auto-toxemia as revealed by careful differential blood count and urinalysis, the anesthetic is given most cautiously, maintaining only the minimum stage of anesthesia during the entire operation; the amount of ether necessary for this being greatly lessened by administering hypodermically from one-eighth to one-fourth grain morphia one-half hour before beginning administration of anesthetic. Too much of the anesthetic has been given and more or less harm done if the patient is not sufficiently from under its influence to open the eyes and respond to slapping or pinching of face by the time the final dressing and bandage is applied before leaving the operating table.

Unless the patient is in the hospital from twelve to eighteen hours before the time of operation, no purgative is given until after the operation, but the bowel emptied by copious enema of soapsuds; no other preparation is made except a tub bath, followed by alcohol rub of entire body; the scalp is shampooed with mercurial soap (1 per cent mercurial iodide P. & D.), the necessary preparation made of area to be operated and dry sterile dressing applied.

After a simple mastoid operation, the outer dressing is removed in twenty-four hours. I do

not pack tightly the mastoid wound. Pack it very loosely. Cut the stitches at the end of the third or fourth day and remove the first packing at that time, and if the bone is covered all over with healthy granulation, allow the wound to fall together. Do not continue the packing process, either with sterile gauze or with iodoform gauze or anything else, after the bony cavity is well covered with healthy granulations. Granulations want nothing better than moisture and gauze to stimulate growth. I do not irrigate the wound, but wipe it out with sterile gauze or cotton, or, if a stimulant is indicated, use iodoform gauze instead.

If I use a modified blood-clot dressing in the classical operation (and this I am very fond of doing) a very small cigarette drain, made of two or three strands of silk-worm gut is left in the lower angle of the wound, and the rest of the wound sutured tightly. When the first dressing is removed twenty-four hours later the little drain is pulled out and the wound is left alone. I expect the patient then to be out of the hospital in from three to six days. I think we make a great mistake in keeping our patients in bed so long, and my rule now is to get them in the wheel chair and out on the roof garden or in the sun parlor by the second or third day; at any rate up and out by the fifth or sixth.

In the radical mastoid operation the outer dressing is removed in twenty-four hours, and then a very light gauze dressing applied. The inner dressing is not removed. If I use the large rubber tube in the auditory canal instead of the gauze packing (which is another modified blood-clot dressing) this is allowed to remain for forty-eight hours. If I pack the mastoid wound after the radical operation, this is not removed until the third or fourth day, when it is removed easily. After the first packing is removed, I use no more gauze except a small wick along the floor of the canal, going well back to the middle ear, for drainage. I use no irrigation of any kind, and until the whole area of the bony cavity is covered with firm granulations I cover the entire operated area with a uniform coating of equal parts of iodoform and boric acid or aristol. I believe iodoform, notwithstanding its disagreeable odor, is more effective in bone cases than the aristol; uniformly cover the bony cavity with this twice a day. That means a little more work for the assistant or the well-trained nurse, but healing is greatly hastened by this frequent attention. As soon as the cavity is covered with granulations I leave off the stimulating aristol or iodoform and use the pure boracic acid powder twice in twenty-four hours. If I have done a clean operation, I shall expect complete dermatization in three to six weeks after the complete radical mastoid operation. I think a great deal of the long-continued after-treatment heretofore so necessary has been due to the fact that we have used too much irrigation and done too much packing. I get the bandages and the heavy dressings off of my radical cases by the fifth day, then put on a very light dressing, kept in place with a light mask to cover the external ear, and wipe out the canal with a sterile cotton swab and repowder it with boracic acid at least every eight or twelve hours.

If the patient, for instance, is very septic, the leucocyte count is low and the polynuclear percentage high, I begin large doses of urotropin before the patient has recovered from the anesthesia, given by the bowel, thirty to sixty grains in three or four-ounce salt solution, used as we do protoclysis. Usually this is accomplished without trouble. Four hours thereafter, if the stomach is quiet and no nausea, ten grains of urotropin is given every four hours, in four or more ounces of water, until two or more drachms are given.

As soon as the patient recovers from the anesthetic, I give one large dose of calomel, never less than five or ten grains at the first dose, and rarely ever more than fifteen or twenty grains. If the patient is very septic, the urine full of indican, I give a dose of fifteen or twenty grains calomel, followed by magnesia sulphate in six to eight hours. Whether it be a radical mastoid, frontal sinus or what not, the patient is on a restricted diet for at least three days. I want all of the resistive forces to go to the repair of the wound, the recovery from the shock, and not to be utilized in faulty digestion, assimilation and elimination. The patient is not going to starve in a few days. Give fruits, buttermilk, broths, etc., and rest—mental as well as physical rest. I think, as practitioners of medicine, we do not fully appreciate the great advantage of the psychology of the after-treatment of these cases. I do not allow relatives and sympathetic friends around the patient for at least two or three days after the operation. Let them see nobody but the nurse and the doctor. We all know something of the effect of mind over matter, and the mental attitude of the anxious and sympathetic parent or relative is frequently injurious. Especially is this true with children.

In the modified Killian frontal sinus operation I use no packing. I put a large rubber tube down through the floor of the frontal sinus and bring it out of the nose. Of course, if the tur-

binates are removed the anterior ethmoid cells are removed also and there is no packing used. This external wound is closed tightly at the time of the operation; the tube is removed in from twenty-four to thirty-six hours, or as soon as it will come out without use of force. When you desire to remove the tube, take hold of it at the lower end with a haemostat and make slight tension on it and it comes away without trouble or bleeding. I am sure in my first cases I did a great deal of harm by irrigations and mopping, causing irritation and often a mixed infection retarded the healing process. What the wound needs is drainage and ventilation, and if I have drained and ventilated it well, this is going to do it more good than anything else. If the nose is obstructed on the floor, you can clean it out by aspirating with a medicine dropper and sterile saline solution, or use forceps and cotton mop. In the Caldwell-Luk operation through the canine fossa, a thorough opening is made into the nose. I usually pack the cavity once only. At the time of the operation I pack it lightly with gauze soaked in 25 per cent solution argyrol, left in for twenty-four to thirty-six hours, then remove it, and use a small wick to keep the wound open for a day or two. In cases of this kind I would irrigate once or twice, perhaps, the third and the fourth day; after that there is no irrigation, the wound is allowed to close in the mouth and the drainage and ventilation take place through the nose. After removing the middle turbinate and curetting the ethmoid cells I never use any packing, and I am not troubled with hemorrhage and obstructed breathing as formerly, since I have been using the flexible perforated nasal tube splint. This prevents the patient from snuffing and snorting and getting a loose clot, and respiration and drainage are not interfered with. I keep these cases in the hospital for twenty-four to forty-eight hours.

This is, briefly, the method that I use in my major cases. I have nothing new to add about the brain cases. I still adhere to the teaching of Ballance when I open a brain abscess. As soon as I find pus I leave my perforator or probe in situ and insert several small rubber tubes alongside of the same, until sufficient number are placed for drainage of the abscess cavity, and never use gauze. If I withdraw my knife or perforator with which I have found the brain abscess and reinsert it, or forceps, to insert the drainage tube, I am going to open up new avenues of infection. I remove one tube at a time, beginning, perhaps, on the third, fourth or fifth day, until finally we get down to the one tube, and that is practically pushed out in the process of healing. The same treatment that I have suggested holds good with the extra-dural abscesses. We usually find these as the result of infection through the tegmen tympani or antri, and in these I use no firm packing.

In conclusion, I need not emphasize that all after-treatment should be given in a strict aseptic or antiseptic manner, in order to avoid localized secondary infection. Do a clean, complete operation, but do not "overdo it." Especial care should be given toward restoring to normal the lowered resistance caused by the condition which rendered the operation necessary; to this end attention is given to the internal secretions and excretions. Slow and unfavorable progress after many complete operations done with faultless technique is often due to injudicious food and insufficient rest. After major rhinological operations I give small doses of iodine three times daily until its effect is indicated by increased discharge of mucus from the nose.

BOOK REVIEWS

Golden Rules of Gynecology.

By George B. Norberg, M.D., Professor of Diseases of Women and Clinical Gynecology, University Medical College, Kansas City, Mo.; Gynecologist to Kansas City General Hospital; Fellow and Ex-President, Kansas City Academy of Medicine. 250 pages. 8 vo. Price, $2.25. C. V. Mosby Co., St. Louis, U. S. A.

This book is an excellent summary of the subject of gynecology, and as such is especially valuable to the young doctor preparing for state board examinations, and to the busy practitioner who wishes to secure the greatest possible amount of information in the fewest words.

Instructions in Sanitation.

The Department of Sanitation, Canal Zone, Geo. W. Goethals, chairman and chief engineer, has approved a "Manual of Instructions" issued by W. C. Gorgas, chief sanitary officer. It is addressed "to all concerned," and is "for the guidance of all sanitary inspectors." It is a paper-bound pamphlet of 52 pages. Every alternate leaf is of plain, white, ruled paper, ready to receive notes and memoranda. Its general heads are: I. General Instructions. II. The Personnel. III. Material and Supplies. IV. Cemeteries, Burials, Death Reports and Burial Permits. V. Inspection. VI. Pit and Pail Closets. VII. Garbage and Manure Disposals. VIII. Work Requests. IX. Disinfection, Fumigation and Quarantine. The text is intensely practical and prescribes the work for sanitary officers in a way that cannot be misunderstood. All sanitary officers of whatsoever degree and station would do well to provide themselves with copies. Address Department of Sanitation, Canal Zone, Panama.

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Next Meeting, Lexington, Ky., November 18, 19, 20, 1913

EDITORIAL DEPARTMENT

THE S. M. A. SPECIAL TRAIN TO THE MINNEAPOLIS MEETING OF THE A. M. A.

From the many inquiries that we have received regarding the itinerary, schedule and sleeping car accommodations of the Southern Medical Association special trains, there can be no doubt but that the South will have a large and enthusiastic delegation in Minneapolis.

The special over the Louisville and Nashville will be one of the handsomest trains ever sent over a Southern railroad. Every possible comfort will be provided, including dining and observation cars from New Orleans to Minneapolis.

Some of those going on the special desired to stop over a few hours at Mammoth Cave, Louisville and Chicago, but a larger number seem to prefer leaving home as late as possible and yet arrive in Minneapolis in time for the opening session. It was therefore decided to make no stops, except for passengers, from New Orleans to Chicago, and since the special is run only one way, those desiring may take advantage of the stop-over privileges, at their convenience, on the return from Minneapolis.

The Southern Medical Association Special will join at Chicago, and will be run as a section of the "President's Special," which as a compliment to President-elect Witherspoon, will leave Nashville on the evening of June 16. The Southern Medical Association Special from Washington and Norfolk over the Chesapeake and Ohio via Cincinnati will also be run as a section of the "President's Special" from Chicago to Minneapolis.

We give below the itinerary and schedule of the special over the Louisville & Nashville Railroad from New Orleans to Minneapolis. For information regarding rates and sleeping reservations confer with your local agent, or with any agent of the L. & N. The Secretary

of the Southern Medical Association will also be glad to give any information within his knowledge.

Itinerary of Special Train.

Leave New Orleans (L. & N. R. R.) 8:30 a.m., June 15.

Leave Mobile (L. & N. R. R.) 12:53 noon, June 15.

Leave Montgomery (L. & N. R. R.) 6:00 p.m., June 15.

Leave Birmingham (L. & N. R. R. 8:45 p.m., June 15.

Leave Decatur (L. & N. R. R.) 11:29 p.m., June 15.

Leave Nashville (L. & N. R. R.) 3:10 a.m., June 16.

Arrive Louisville (L. & N. R. R.) 8:00 a.m., June 16.

Leave Louisville (Penn. R. R.) 8:30 a.m., June 16.

Leave Indianapolis (Penn. R. R.) 12:15 noon, June 16.

Leave Logansport (Penn. R. R.) 2:45 p.m., June 16.

Arrive Chicago (Penn. R. R.) 5:45 p.m., June 16.

Leave Chicago (C. M. & St. P. R. R.) 6:30 p.m., June 16.

Arrive Minneapolis (C. M. & St. P. R. R.) 7:10 a.m., June 17.

THE SPECIAL FROM WASHINGTON AND NORFOLK TO MINNEAPOLIS.

The Chesapeake and Ohio Railway will run a special train with sleepers from Baltimore, Washington, Norfolk, Richmond and Charlotte to accommodate the members of the Southern Medical Association and their friends from Maryland, District of Columbia, Virginia, North Carolina and West Virginia, who intend going to the Minneapolis meeting of the American Medical Association.

The exact schedule of this train has not yet been fixed, but it is probable that it will leave Washington about three o'clock Sunday afternoon, arriving in Cincinnati Monday morning, and in Chicago in time that afternoon to run as a section of the "Presidet's Special" from Chicago to Minneapolis.

Physicians in the above mentioned States can get full information regarding rates, schedules, etc., from their local agents or by writing any agent of the Chesapeake and Ohio Railway. The Secretary of the Southern Medical Association will also be glad to give any information that he can regarding this special.

LOUISVILLE FOR THE 1914 MEETING OF THE A. M. A.

Louisville will extend an invitation to the American Medical Association for the 1914 session, and surely the invitation should be accepted.

Those delegates who attended the Atlantic City meeting last year will remember the oratorical gems by Dr. Curran Pope and Dr. Arthur McCormick, in which Louisville was depicted as the center of a region more lovely and fertile than artist's ideal or poet's dream; where they rear the blooded horses and the beautiful women, the noble men and the matchless brew of Bourbon that are the glories of civilization and the pride of Kentucky.

Louisville is the logical meeting place for the A. M. A. It is near the center of population of the United States, it is a magnificent city, with splendid hotels and railroad facilities unequaled. It is near Mammoth Cave, which should be visited by every American, and there is much of interest to the traveler in Louisville and Kentucky.

It is a great medical center, having one of the largest and best equipped medical schools in the entire United States. The new million-dollar hospital will provide as fine clinics as any city, and both from the viewpoint of pleasure and scientific interest the A. M. A. cannot find a better meeting place than Louisville.

The American Medical Association has not met in the South in ten years, and the Southern delegates should pull together for Louisville for the 1914 meeting.

S. M. A. REPRESENTATIVES AT STATE MEETINGS.

During April and May quite a number of the State medical associations of Southern States were held, and were uniformly well attended.

The officers of the Southern Medical Association, believing it right and proper that their organization should display its friendly interest in these State associations, arranged to have a representative present at each when it was practicable to do so, and in every instance the visitor was cordially welcomed. President Jones himself attended the meetings of the Mississippi, Texas and Arkansas associations, in addition to the regular representative. Everywhere great interest was shown in the Southern Medical Association and approval of its work. Indeed 443 of the doctors demonstrated their approval by sending in their applications for membership. This is as it should be. The natural articulation of organized medicine in this region is, first, the county medical society, next the State medical association, and then, as the fruitful flowering of the whole beneficent development, the Southern Medical Association. The Southern doctor who would keep abreast of the rush of progress will find many organizations that may be of advantage to him, but these three he *must* personally support. They are indispensible.

THE MEDICAL COLLEGE OF SOUTH CAROLINA.

For enterprise and energy that insures success commend us to the people of Charleston, S. C. The city boasts a population of something like 60,000 souls. During the last week in April the citizens devoted their energies to raising the money with which to build and equip a first class medical college, to be known as the Medical College of South Carolina. Before Saturday night they had secured solvent subscriptions amounting to over $75,000.00. Nothing inferior to a class "A" college will be tolerated, consequently the equipment and administration will be first class in every respect. The undertaking and its success were truly remarkable. It demonstrates a quality in her medical profession that must be admirable and shows an enterprising generosity in the people of the city which points to inevitable success, not only in this instance, but in every other to which they devote their united attention. The JOURNAL prophesies great things to mark the future course of the Medical College of South Carolina.

THE GLUCOSIDS OF DIGITALIS.

It is well known that the glucosids, digitalin and digitoxin, represent the most desirable therapeutic properties of digitalis, and if they had, for years past, been supplied to practicing physicians in forms as truly representative of the herb as morphine is of opium they would long ago have become the accepted forms for its administration. There exist in the so-called Galenical preparations, such as tinctures, extracts or infusions, undesirable elements that are avoided by the use of the approximately pure glucosids. It is only during recent years, however, that pharmaceutical chemistry has been able to separate the active principles of digitalis in sufficient purity and uniformity to merit the entire confidence of the medical profession. Though it is not probable that absolute purity is even yet obtained, still it has been so approximated that physicians everywhere are beginning, and many began long ago, to substitute the certain glucosids for the uncertain administration of an unknown mixture of glucosids with other elements still less known. At once the question rises: Which glucosid? Digitalin, digitalein or digitoxin? And are they suitable for hypodermic administration? Digitalin is only slightly soluble in water (Thornton, Culbreath), and irritating to the tissues (Abbott). Digitalin is insoluble in water according to Culbreath, but is classed by Cushny as more soluble than digitoxin, and digitalein as very soluble. Sollmann classes digitalin, digitalein

and digitoxin as "fairly soluble." The importance of solubility in hypodermic medication should be recognized. A gradual accumulation of a digitalis glucosid under the skin might result disastrously. The variations of opinion concerning the action of the digitalis principles leave the ordinary physician to form his own conclusions. Under the circumstances perhaps an aseptic, condensed, aqueous fluid extract suitable for hypodermic use, or a refined preparation such as "digalen," will give more general satisfaction than either of the principles by itself.

Altogether the study of digitalis, its active principles and their uses, is one of the most important of our therapeutic problems.

CHRISTIAN-SCIENCE MURDER LEGALIZED.

Only the wholesome fear of arrest and imprisonment can explain the moderation with which the editors of the New Orleans Medical and Surgical Journal speak of a recent decision of what is known as the "Henderson Case" in the courts of Louisiana. Under the so-called treatment of a Christian Scientist a child died with diphtheria. The helpless victim was not given any option between life and death, but was allowed to die as a noble example of faith in Mrs. Eddy and professional prayer. Statistics multiplied many hundreds of thousands of times prove that with early, modern treatment not more than one out of a hundred diphtheria patients will die, while without it from 65 to 70 out of every hundred cases will be fatal. Not one accepted fact in ordinary knowledge, from the rotundity of the earth to the antagonism between fire and water is better proven than this fact, yet Christian Science parents will see their children pass the only hours which hold their chance for life while they strive by prayer for the same relief in this positive disease that they have seen when only nervous fancies were the matter. It was supposed that the law would protect such helpless innocents from experiments that experience has proven to be so fatal. But the judge of a Louisiana court, because he believes that praying for one's self or another is eminently proper, concludes that it is also eminently proper to let a baby die if the prayer did not happen to be granted, and that the man responsible for that death is not only blameless but praiseworthy. Surely such a judge is an anachronism, and needs the "recall" without respite. Fanatics in Louisiana are now at liberty to fill little graves with diphtheria victims as often as it suits their Christian Science parents. If they cannot pray them *out* of suffering they can pray them *into* Heaven, so what's the difference?

SOME POTATOES.

The A. M. A. Journal of January 11, 1913, discusses some experiments in nutrients conducted by Hindhede in Denmark. He "observed a subject who, for more than a month, subsisted on potatoes and fats of various descriptions without other additions to the dietary." He computed the daily intake of protein at less than 40 gm. The body weight remained unchanged and "at the end of the five weeks nitrogen equilibrium was established." During that time the subject ate about five pounds of potato and nearly a quarter of a pound of butter every day. A one pound potato is considered a very fine one in this part of the moral vineyard and to swallow five such every day for five weeks, even although liberally lubricated with grease of Goshen, equals the classical stunt of "a partridge a day for thirty days," and worse. For be it remembered the potato in question is known to us of the South as the Irish potato, to avoid its confusion with the saccharine root of the luscious yam, the Heaven born sweet potato. Had that misguided "subject" away over in Denmark been feasted upon genuine "yellow yams" during the period of his "observation;" if the morning meal had spread before him the rich, fragrant, steaming, golden heart of a yellow yam, fresh from its scorched and syrupy

envelope and ornamented with spots of good, sweet butter; if the mid-day meal had been one of Aunt June's sweet potato custards covered with snowy "marang;" if for supper he took a few thin slices just fried in the remainder of his quarter pound of butter; then, ah then, no surprise need be felt that whether or not "the body weight remained unchanged." he had at least lost no flesh, and that the "nitrogen equilibrium" was not established, but wanted some more. Some physicians claim that the sweet potato carries in its sugary pulp too much woody fiber for enteric prosperity. Go to, thou shallow reasoner! The Creator of the sweet potato made it to be eaten, enjoyed and digested, if properly cooked. Cold or hot it goes the right way. The Irish potato may be the standard for Northern and Western tables, and for the chilly climes of Denmark, but here in the sunny South we swear by the "yellow yam," the apotheosis of hypogaeous fructification.

THERAPEUTICS

HYOSCYAMUS.

Hyoscyamus, or henbane, is a plant common in this country. Only plants two years old are used in medicine. An extract, a fluid extract and a tincture are prepared from it, and two important alkaloids, hyoscine and hyoscyamine, are derived from it. The latter two are used as sulphates, or more often in the case of hyoscine as a hydrobromide.

Hyoscyamus is generally considered identical in its effects with belladonna, but such is not the case. It is less of a cerebral excitant and more of a hypnotic than belladonna. It is less stimulating to the heart and respiration. On the other hand, it has a more sedative effect upon the sphincter of the bladder, and in laxative compounds seems to induce a more gentle, painless action. Hyoscyamine is a powerful nerve sedative, and, with children, almost a pure hypnotic. For this purpose hyoscyamine, either the sulphate, the hydrobromide, or the amorphous hyoscyamine, may be used, the dose of the crude alkaloid being 1-250 of a grain (0.0002 gm.), and that of the salts 1-500 of a grain (0.00012 gm.). These doses may be once repeated if necessary. Children are less susceptible to belladonna and hyoscyamus than are adults, considering size and weight. Hyoscine hydrobromide is a powerful nerve sedative and soporific. It causes a sense of weakness and helplessness before sleep comes that is unpleasant. It is by many considered entirely unfit for administration to children. Insane patients who are noisy and belligerent are quieted by moderate doses. They learn to dread them and though unharmed by the effect the memory of it exerts a wholesome restraining influence that tends to good behavior. It is in relieving the insomnia and excitement that threaten insanity that hyoscine is especially useful.

A combination of hyoscine, cactin and morphine has been used hypodermatically as a general anesthetic, under whose influence it is claimed that capital operations have been performed, and the pangs of childbirth obliterated. At the present time quite a controversy prevails concerning the usefulness of the combination and the character of one of its ingredients, cactin. Too many intelligent physicians support the claims of this combination not to have some foundation for their faith. Unfortunately the element of personalities obscures the truth to some extent. It is as follows:

Hyoscinae hydrobromatis, grain 1-100.
Morphinae sulphatis, grain 1-4.
Cactinae, grain 1-8.
For one tablet.

Another formula contains just half the amount of each of the above. It is claimed to be especially important that the hyoscine shall be pure and derived from the hyoscyamus plant, and not the alkaloid scopolamine from the plant scopola. The alkaloid from scopola is chemically identical with hyoscine and as it is much cheaper it has generally been substituted for the latter by manufacturing druggists. Though it has not yet been proven that there is any essential difference, it is, to say the least, an unwarranted substitution. The physician competent to order hyoscine or its salts is also capable of ordering scopolamine and its salts, and the substitution of one for the other without notice is nothing but "a trick of the trade." Moreover, there is reliable testimony that, instilled into the eyes of a patient, equal doses of the drugs in question, one drug dropped

into one eye and the other into the other eye, the results were not simultaneous nor exactly the same. Contradictory testimony could doubtless be found, but all must agree as to the authority of the written prescription. The clinical, and not the chemical test, assigns such drugs to their proper positions in therapeutics.

SCOPOLA.

As has just been said, scopola and its alkaloid, scopolamine, is so nearly like the alkaloid of hyoscyamus that what is said of one applies to the other. In most instances they may be given indiscriminately, but in the compound called H. M. C., or morphine-hyoscine-cactin tablet, it is earnestly insisted by many that results will not be the same unless absolutely pure hydrobromate of hyoscine, from hyoscyamus, is used.

STRAMONIUM.

Stramonium is the ordinary Jamestown, or "jimpson weed," that grows luxuriously in rich, damp places. It furnishes an extract, a fluid extract, an ointment and a tincture that are official. The leaves of the plant are sometimes mixed with willow leaves, or tobacco, and smoked in cigarettes or pipes as a remedy for the paroxysms of spasmodic asthma.

Stramonium and its preparations are narcotic, anodyne, antispasmodic and mydriatic. It is similar to belladonna in its effects, but more powerful. It deranges the rhythm of the heart to a greater extent, and is decidedly more delirifacient. The tincture is sometimes used in nymphomania, puerperal insanity, neuralgias, dysmenorrhoea and chorea. The dose is fifteen to twenty drops every four hours (1.0-1.2 c.c.).

The extract is a useful ingredient of suppositories for painful piles.

Daturin, its alkaloid, possesses powers similar to those of atropine, but is seldom used. The powdered leaves, mixed with one-fourth their weight of powdered tobacco, are efficient in asthma, burned in the room and the smoke inhaled. Poisoning has occurred from its reckless use in this manner.

The antidote for sramonium, hyoscyamus and belladonna poisoning is pilocarpin given hypodermatically.

CURE FOR CHOREA.

Prof. Pierre Marie, of the Paris Academie de Medicine, announces the cure of 25 children with chorea by the intravenous injection of salvarsan. The doses were from 0.2 up to 0.35 gm. once a week for four doses. No symptoms of anaphylaxis were noticed. As a rule, the disease was cured in three or four weeks. He failed to procure the Wassermann reaction in any one of the eight children whose spinal fluid he examined. It is thought by some that the effect of the newer preparations of arsenic is capable of more general application than merely as a specific for syphilis.

CAMPHOR.

The A. M. A. Journal of January 4, 1913, makes a few good points in favor of camphor as a stimulant. For a failing (non-compensating) heart during serious illness it suggests one or two teaspoonfuls of aqua camphorae every 3 or 4 hours. Each teaspoonful, it says, contains a little more than 1-4 grain of camphor. Its hypodermic use, dissolved in oil, is also recommended.

It stimulates the highest centers of the brain, thus aiding efforts at control in hysteria, etc. It increases peripheral circulation, and thus seems to relieve congestion. Unlike alcoholic stimulants its action is not followed by a corresponding depression.

CORRESPONDENCE

ONE BETTER.

S. H. Hairston, B.Sc., M.D., Meridian, Miss., writes to the Journal a description of a very unusual combination of difficulties, as follows:

"When I was called to see this woman I found her in labor with one hand and arm of the child out of the vulva. She had been this way for twelve hours. After I had everything prepared I introduced my hand into the uterus and pulled down a foot. In doing so I fractured the thigh about the middle third. In trying to deliver the breech I fractured the other thigh in the same place. I noticed at this time the child had talipes calcaneus in both feet. When I turned the child with its back to the front I noticed it had spina bifida. I had trouble in delivering the after coming head on account of its size. After accomplishing this I noticed the head very large, a cleft palate, and har elip. It later developed the worst case of hydrocephalus I ever saw. This has been four years ago, and one year ago the child was seemingly in good health, but the head was still so large it could not sit up."

BOOK REVIEWS.

Diseases of the Stomach, Intestines and Pancreas. The New (2nd) Edition, enlarged. By Robert Coleman Kemp, M.D., Professor of Gastro-intestinal Diseases, New York School of Clinical Medicine. Second edition, revised and enlarged. Octavo of 1,021 pages, with 388 illustrations. Philadelphia and London: W. B. Saunders Company, 1912. Cloth, $6.50 net; half Morocco, $8.00 net.

It is only during recent years that the medical profession has realized the importance of the diseases of the digestive organs among human ills. The elusive title, "stomach trouble," was accepted as an excuse for many otherwise inexplicable conditions. It is now generally recognized that "colon bacillus infection," "duodenal ulcer" and "diseases of the pancreas" are separate items in the so-called "stomach trouble," each with its own train of symptoms and its own special dietary and therapeutics. Excess or paucity, or abnormality of any one of various digestive secretions call for their own diagnosis and treatment.

The stomach is the first point of distribution for the supplies that are to sustain the army of life, and it must be kept in actively normal condition, together with every divided detail pertaining thereto.

The work under consideration treats fully and in minute detail of everything thus far learned concerning the diseases and derangements of the commissary department of the human body. It is written by a master of the whole subject.

Henly's Twentieth Century Book of Recipes, Formulas and Processes.

Edited by Gardner D. Hiscox, M.E. Third Edition. Price, $3.00. Published by the Norman W. Henley Publishing Company, New York.

There are nearly ten thousand recipes, processes, etc., scientific, technical, mechanical and domestic, in this solid, useful volume of almost 800 pages. Doctors will not learn from it how to heal the sick, but it will tell them how to meet a host of little, unexpected problems of everyday life that no mere medical book would help in from making mucilage to killing bugs; from catching flies to making cement walks. It is one of those things that are "good to have in the family."

Internal Medicine.

By David Bovaird, Jr., A.B., M.D., Assistant Professor of Clinical Medicine in the College of Physicians and Surgeons of Columbia University; Associate Visiting Physician of the Presbyterian Hospital, etc., New York. With 109 illustrations and seven colored plates. Published by the J. B. Lippincott Company, Philadelphia and London, 1912.

The author of this book of 618 pages likens his work to that of the modern builder, who first erects his framework of steel and adds thereto the elements required for its completion. He says: "The purpose of this work is to supply the framework of internal medicine." His classification may in some instances depart from the usual, but he is always reasonable. He begins his study at "Diseases of the Respiratory Tract." The commonly accepted order is followed in most cases, namely, etiology, pathology, symptoms, diagnosis, prognosis, treatment. The illustrations are excellent, pertinent and new. Those of uncinariasis could not be excelled. In the crowd of medical books that tell everything, except how to practice medicine, it is refrshing to meet one that teaches nothing else than how to practice medicine. The book is made of very strong, heavy, smooth paper, neatly and strongly bound, a credit to its class of work.

Principles of Hygiene.

The New (4th) Edition. For Students, Physicians, and Health Officers. By D. H. Bergey, M.D., First Assistant, Laboratory of Hygiene and Assistant Professor of Bacteriology, University of Pennsylvania. Fourth edition thoroughly revised. Octavo of 529 pages, illustrated. Philadelphia and London: W. B. Saunders Company, 1912. Cloth, $3.00 net.

Never before in the history of medicine has the study of hygiene been exalted to such a lofty position in the esteem of the profession and the laity as it is today. The wonderful advances in microscopy, pathology and chemistry have laid bare to the eye of the searcher the secrets of danger and disease heretofore hidden beneath imaginary defenses, such as cold, heat, dampness, fog, sun, heat and exertion. This work is a trustworthy guide to public and private hygiene with their thousand ramifications of circumstances and results. It illuminates the path of energy to the summit of success. It is the latest verdict in hygiene.

State Board Examination Questions and Answers.

William Wood & Co., Publishers, New York, have issued a fourth edition of this well-known book, thoroughly revised and brought up to date of the autumn of 1912. There are several occasions when such a work comes in handily. Members of state boards of medical examiners like to see the work of other boards, and to review that of their own. Applicants for license who have to go before them feel fortified by learning what style or class of questions they will be apt to meet. Examples from thirty different States are given. Teachers preparing quizzes or examinations for their classes will see what questions are considered adequate and fair all over the United States. The book contains 812 pages, and to those needing such an assistant is worth the price, $3.00.

RECENT METHODS IN THE DIAGNOSIS AND TREATMENT OF SYPHILIS.

By Carl H. Browning, M.D., and Ivy McKenzie, M.A., B.Sc., Ch.B., both of Glasgow. Lea & Febiger, Publishers, Philadelphia and New York.

The book bearing the above formidable title is in reality a work of moderate size, 198 pages, but it tells all that is yet known about the modern im-

provements in diagnosis and treatment of syphilis.

It is written in collaboration with several other prominent medical men and has an introduction by the well-known Dr. Robert Muir, of the University of Glasgow. No more important subject of world-wide bearing can occupy the attention of physicians than syphilis, and this book affords, in condensed form, all of the modern, accepted views thereon. Few doctors can afford to be without a copy.

Text-Book of General and Special Pathology.

For Students and Practitioners. By Henry T. Brooks, M.D. Illustrated with 525 half-tone and other text engravings. (110 in colors.) Also fifteen full-page plates in colors, containing forty figures. F. A. Davis Company, Publishers, Philadelphia. 1912.

This is a large, well-printed volume of 1,127 pages. The type is a little smaller than is customarily used in books of this character. Indeed the pages carry nearly 40 per cent more matter than usual. The result is a book containing all that is known at this time concerning "general and special pathology." The paper is excellent, the printing sharply cut and clear and the general make up entirely satisfactory. Few of the illustrations are new, but proper credit is carefully given to their authors. Some of the colored plates are beautiful.

Manual of Chemistry.

A Guide to Lectures and Laboratory Work. A text-book specially adapted for students of medicine, pharmacy and dentistry. By W. Simon, Ph.D., M.D., and Daniel Base, Ph.D. Tenth Edition, thoroughly revised, eighty-two illustrations, one colored spectrum plate and eight colored plates representing sixty-four chemical reactions. Lea and Febiger, Philadelphia and New York. 1912.

The above announcement is almost sufficient to convey an adequate understanding of the character of this splendid work. No modern student of medicine can be unaware of the place Simon's Chemistry occupies in the curriculum of standard medical schools. The demand for ten large editions in rapid succession demonstrates its superiority.

In this new edition a number of important additions appear. Space will not allow mention of any material number of them, but some that are specially of interest in medicine are: Sodium cacodylate, atoxyl, salvarsan, phenolphthalein, fluorescin and phenolsulphonephthalein.

A table of international atomic weights on the O-16 basis has been added to the U. S. P. table of weights on the H-1 basis. The book affords to the student a clear presentation of the science of modern chemistry and a reliable guide to his work in the laboratory.

A Manual of Auscultation and Percussion.

Embracing the Physical Diagnosis of Disease of the Lungs and Heart and of Thoracic Aneurism and of Other Parts. Sixth Edition, revised and enlarged by Haven Emerson, A.M., M.D. Lea & Febiger, Philadelphia and New York.

Another edition of Flint's Manual will be welcomed by students and practitioners everywhere. The clear precision of his sentences, the completeness with which he handles every subject and the wide range and practical applications he makes of his observations constitute a veritable treasure house of "signs." No medical library is complete without a copy of this sterling work.

Physical Diagnosis.

By Richard C. Cabot, M.D., Assistant Professor of Medicine in Harvard University. Fifth Edition, revised and enlarged. With five plates and 268 figures in the text. William Wood and Company, New York. 1912.

It was Richard C. Cabot who first ventured to incorporate in a text-book the opinion that the sphygmograph was "a fascinating but useless toy."

His opinion is changed by more recent discoveries so that he now believes that the mechanism of the heart may be identified in the majority of cases in which it is irregular by a careful examination of the radial pulse tracing alone.

Among the new things presented in this volume are colored plates of arterigrams, phlebograms and electrocardiograms. The mere announcement of a new edition of Cabot's Physical Diagnosis is enough to insure the general interest of the medical profession.

SOUTHERN MEDICAL NEWS

ALABAMA.

The Mobile and Ohio Railroad is vaccinating all its employes against typhoid fever. At Whistler, near Mobile, Chief Surgeon H. T. Inge and his assistants inoculated 110 employes in one day.

The Mobile City Health Officer, Dr. Charles A. Mohr, in striving to prevent the breeding of flies in stables by having cement floors laid down, was met by an injunction which will delay the work. Ordinances regulating the handling of milk and other foods are now in force and house to house inspection is carried out at frequent intervals.

It is estimated that it will require two months of hard work by Dr. C. A. Grote, of the hookworm commission, to complete the hookworm work in Chilton County. The work began at Mountain Creek in the first week of April.

The Etowah County Medical Society met at Gadsden April 2. Papers were read and discussed.

Quite an energetic health campaign is under way in Mobile. Several able speakers, among them Drs. Oscar Dowling, of New Orleans, and Dr. W. A. Evans, of Chicago, have addressed large audiences on the subject, and the two daily papers,

the Register and the Item, devote liberal space to arousing public interest.

ARKANSAS.

Governor Futrell, of Arkansas, has signed a bill providing for an annex and other improvements to the state hospital for nervous diseases at Little Rock. Wards for convalescents, tuberculosis patients and others, male and female separately, and a school for nurses will be established. The appropriation for the next two years is $584,000.

A case of smallpox was discovered in Helena on the 24th of March. Its presence is unaccountable, as the victim has not been out of the city and no known infection has come from abroad. Isolation was at once established and all known to have been exposed were vaccinated.

The physicians at Jonesborough have united on a scale of regular charges which will obviate financial competition. The rates are about one-fourth higher than previously.

Dr. T. M. Fly, a hookworm specialist who has recently been operating in Independence County, moved to Searcy early in April and is investigating conditions in White County.

Dr. E. C. Wittwer, for the past two years resident at Van Buren, will move to Mountain Home, Mo., to recuperate his health. He plans to return to Fort Smith as soon as he is entirely well. A fall from a street car was the cause of his ill health.

At Desha, a small town in Independence County, an outbreak of meningitis was reported on April 2. There have been four cases, with one death.

GEORGIA.

At Savannah, the Georgia Medical Society has obtained an option on a handsome residence to be used as headquarters. It is of brick, three stories and a basement in height, and will make a commodious home for Georgia doctors and their visitors. They will take possession next October, when the lease of the present occupant, Mrs. M. G. Baker, will terminate.

At the meeting of the Medical Association of Georgia in Savannah last week, the Georgia Surgeons' Club was organized with a view of improving surgical conditions in this State.

The officers elected were as follows: Dr. E. C. Davis, President; Dr. T. J. McArthur, Cordele, Vice-President; Dr. R. M. Harbina, Rome, Secretary-Treasurer.

The tragic death of little Clarence Bigby, whose refused admission to the hospital because he was dying of meningitis and allowed to expire at the Rescue Mission in Marietta Street, has aroused so much indignation that it would now be impossible for such a regrettable thing to happen in Atlanta. Scores of persons were exposed to the infection before the room in which the grief-stricken mother was sole nurse was disinfected.

A few weeks ago Dr. John T. Patterson of Atlanta pleaded guilty before Judge Newman, of the United States District Court, of sending harmful reading matter through the mails. He is said to have answered a decoy letter sent to him by government detectives.

A number of persons at Dawson who were bitten by a fox terrier have been notified by Dr. Clarence B. Greer, State pathologist, to whom the head of the dog was sent, that the animal was undoubtedly suffering from rabies. He urges the local physicians there to send all persons who were bitten immediately to Atlanta for treatment.

At a recent meeting of the Richmond County Medical Society the discussion was devoted to a consideration of the surgical pathology and treatment of the liver. A visitor, Dr. A. Vander Veer, of Albany, N. Y., participated in the discussion.

A meeting of the Second District Medical Society of Georgia will be held at Thomasville on April 23, by special appointment.

Dr. F. Phinzy Calhoun, of Atlanta, believes that the toxins generated by the hookworm may cause cataract. In the A. M. A. Journal of September 21, 1912, he details the clinical histories of several cases in support of his theory.

FLORIDA.

The Jacksonville Metropolitan, an influential daily paper, is exerting its influence to induce the United States Congress to establish a Department of Public Health, with Col. Gorgas as secretary. It quotes the Southern Medical Journal as favoring both.

KENTUCKY.

Dr. W. L. Heizer, of Bowling Green, State Registrar of Vital Statistics, has mailed to physicians and midwives of Louisville and Jefferson Counties, vouchers for fees for reporting births and deaths during the year 1912. Those for Jefferson County alone amount to about $4,500.

Health officers in Kentucky and other States within the flood lines are everywhere urging the people to boil the water and pasteurize the milk. They are proclaiming that unless these precautions are taken severe epidemics of typhoid are inevitable.

LOUISIANA.

At New Orleans not long since Mr. J. S. Dedebant, of Demourelle Island, was fined $50 on a charge made against him by an officer of the City Board of Health of having adulterated milk

in his possession and refusing a sample for analysis when requested.

At the Louisiana Leper Home, an isolation camp at Carville, La., Mrs. J. W. Phillips, "good angel of the camp," was able to provide a happy Easter for the inmates. The means came from the residue of the Christmas donations, augmented by the Havana-American Tobacco Company.

In March two milkmen at New Orleans, P. Bergis and J. Daret, were fined ten dollars each for infractions of the milk ordinances.

On the 28th of March Mrs. D. A. Milliken, who had previously given to the Charity Hospital of New Orleans the Milliken Memorial Building, presented to the institution a fine, large automobile to be transformed into an ambulance by removing its upper portion and replacing it with an ambulance body already in use upon a horse-drawn running gear. Additions and improvements will be made.

At Monroe, Dr. Oscar Dowling, president of the State Board of Health, condemned the Ouachita parish jail as unfit for service, whereupon the citizens became indignant. Recently a grand jury also investigated the jail and condemned it as "a blot on civilization, a travesty on justice and a disgrace to our common humanity." Dr. Dowling was vindicated.

At Baton Rouge, it is proposed by the Dixie Dairyman's Association, in consultation with a committee from the Louisiana Agricultural Association, to arrange with the State Board of Health for a disinterested party, under the supervision of the board, to weigh and test all milk received from whatsoever source. The expense of this inspection is to met jointly by the shippers and dealers. It is not yet known whether the State Board of Health will undertake this work.

The New Orleans City League of Women's Clubs, through the Secretary, Mrs. H. B. Myers, offered to assist the City Board of Health in inspecting the bakeries. The president of the board, Dr. O'Reilly, declined their assistance. He stated that the work was being thoroughly performed as now organized and that at present any change might be inexpedient. He would, however, be grateful for their co-operation and would promptly attend to any reports or complaints they might send in.

Two deaths from meningitis occurred in the same family, a mother and her fifteen-year-old son, at Eden, during the latter days of March. The husband and three small children are not yet reported as infected.

The Shreveport Board of Health is planning to organize a citizen's campaign against the flies similar to that so successfully pursued last year. Private citizens, merchants, separate wards and the city at large will all offer premiums for the most successful swatter.

MISSISSIPPI.

Dr. W. S. Leathers, State Health Officer of Mississippi, publicly regrets that in his State there is not a hospital that likes to receive tuberculosis patients. Some hospitals refuse them admission and there is no private institution that treats tuberculosis patients as a specialty. He suggests that groups of counties establish hospitals for advanced cases where the disease could be segregated and prevented from spreading and many might be cured by proper treatment and attention.

NORTH CAROLINA.

Dr. H. L. Sloan is in Raleigh acting as assistant director of the hookworm campaign. He is a native of Sampson County and recently completed his term of service in the Presbyterian Hospital in Philadelphia.

In Guilford, Dr. J. L. Moorefield, of Guilford College, was convicted on April 1 in three cases charging that he retailed whisky. Fines and costs amounted to more than three hundred dollars. Counsel for the defendant argued that there was malice behind the prosecution.

The Charleston News of April 3 was delivered of the following pithy sentences:

"God does not fix the death rate."

"Wash your hands very carefully before handling food."

"Don't put your fingers, your money or your pencils in your mouth."

"Don't bite your finger nails."

SOUTH CAROLINA.

The Chester County Medical Association at a meeting on the 27th of March passed resolutions endorsing the Southern Medical Association and expressing a desire to co-operate with it.

It also endorsed the movement toward the erection of a monument to J. Marion Sims, in Columbia, and will contribute liberally toward the same.

The spring meeting of the Third District Medical Association was held in Laurens on the 27th of March. The counties represented were Newberry, Greenwood, Abbeville and Laurens. Quite a number of papers were read and discussed and at 2:30 p. m. a luncheon was served in the hospital dining room.

Officer for the ensuing year are: Dr. T. L. W. Bailey of Clinton, president; Dr. R. B. Epting of Greenwood, vice-president; Dr. G. P. Neel of Greenwood, secretary.

The trustees of the Medical College of Charles-

ton held a meeting in the office of Governor Blease, at Columbia, April 1, to consult over affairs connected with the institution. No faculty was selected at this meeting.

TENNESSEE.

Dr. S. A. Bowman, a prominent physician of Johnson City, has returned from the Mayo Sanatarium at Rochester, Minn. While there he was operated on for gallstones.

At Chattanooga, Dr. Raymond Wallace was elected as chief of the winter staff and Dr. John B. Steele chief of the summer staff at Erlanger Hospital, April 1.

An instruction car of the Red Cross Society arrived in Bristol Wednesday over the Norfolk and Western from Pulaski. Dr. W. T. Davis, the surgeon in charge, delivered a series of lectures to the public and gives instructions on first aid to the injured.

Dr. George P. Butler of Pulaski has been appointed secretary of the State Medical Examiners. He is a graduate of the Louisville Medical College.

The railroads will honor Dr. J. A. Witherspoon of Nashville, president of the American Medical Association, by running a special "train de luxe" from that city to Minneapolis on the occasion of the meeting of the association in June. It will be designated the "President's Special."

WASHINGTON, D. C.

The attention of the Public Health Service is being called to the fact that swindlers in various parts of the country are trying to deceive tuberculosis victims with advertisements that they are prepared to administer the Friedmann treatment. Dr. Blue wishes it understood that the Public Health Service has given out absolutely none of the culture and neither has Dr. Friedmann. This statement was made on March 24, but the fact still holds good. The Public Health Service will not distribute any of the culture without first making authoritative notice of its intentions to do so and at the date of this writing, April 12, Dr. Friedmann has not done so, consequently all announcements up to this date by individuals claiming to be in possession of the culture may be set down as absolute fakes.

President Wilson, the members of his family and about 150 aids, clerks, servants and domestics, denizens of the White House, were vaccinated against smallpox March 26 to 31. It had been discovered that the parents of a domestic there employed had become affected with the disease.

Dr. Karl von Ruck, from Asheville, North Carolina, visited Washington in the latter days of March to demonstrate another "cure" for tuberculosis. He believes it is similar to the Friedmann antitoxin. The matter was taken up by the Naval Medical Hospital.

All the district employes from the highest to the lowest were required to submit to vaccination against smallpox during the recent epidemic. The health authorities claim by this energetic action they succeeded in stamping out the disease. During the epidemic two ladies, wife and daughter of a newly elected representative, were taken to the smallpox hospital for treatment. The fact that the disease was at first mistaken for chickenpox accounts for its wide distribution.

The case of Dr. Thomas J. Kemp, who was convicted of violating the United States criminal code, has been appealed. His attorney claims that the case was a fictitious one made up by a post-office inspector who sent him a decoy letter.

The Myocarditis of Tuberculosis,

so frequently encountered, especially in the advanced stage of the disease,

May be controlled with the aid of

DIGALEN

"the Standard Digitalis Preparation"

The dosage of Digalen can be adjusted with certainty to the needs of each case. Average dose 8 to 16 minims. All up-to-date druggists carry Digalen. Sample on request.

THE HOFFMANN-LAROCHE CHEMICAL WORKS
440 WASHINGTON STREET
NEW YORK

"KELENE"

(Pure Chloride of Ethyl)

FRIES BROS., Manufacturers, 92 READE ST., NEW YORK

Local and General

ANAESTHESIA

Automatic Glass Spraying Tubes

Sole Distributors for the United States

MERCK & CO., New York, Rahway, St. Louis

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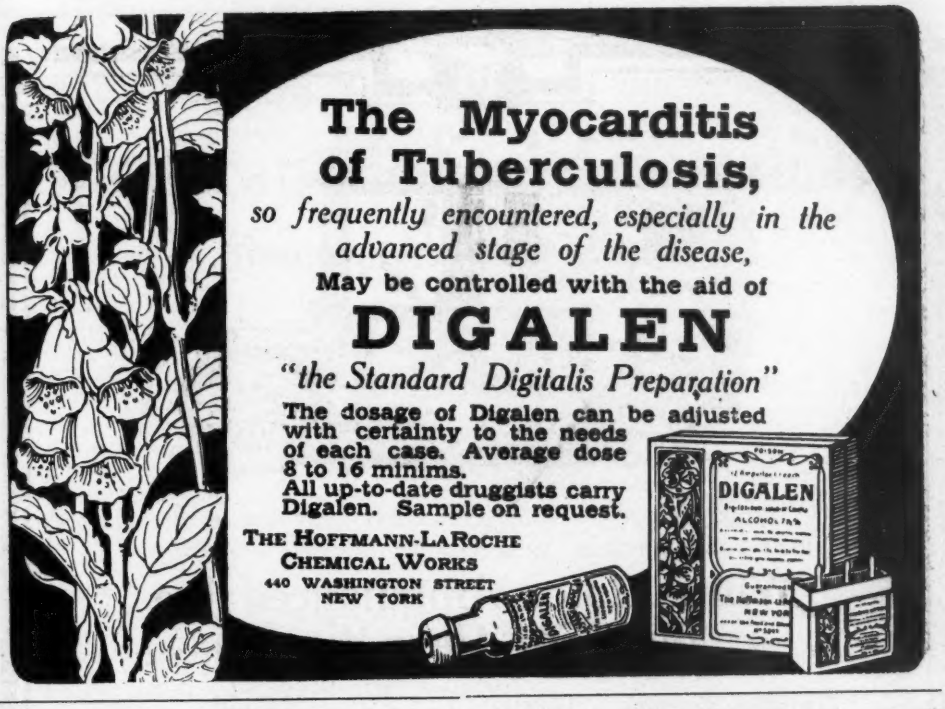
The Myocarditis
of Tuberculosis,
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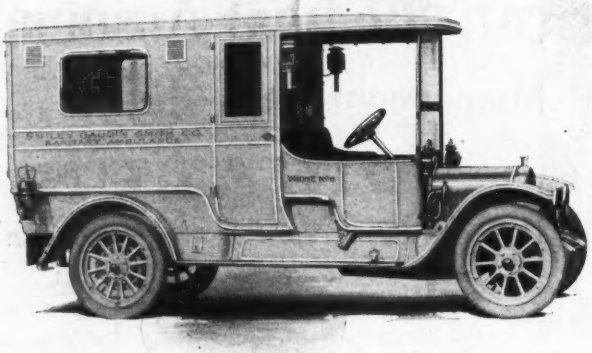

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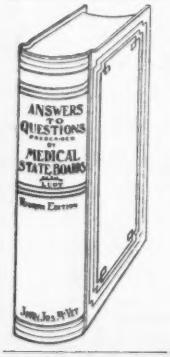

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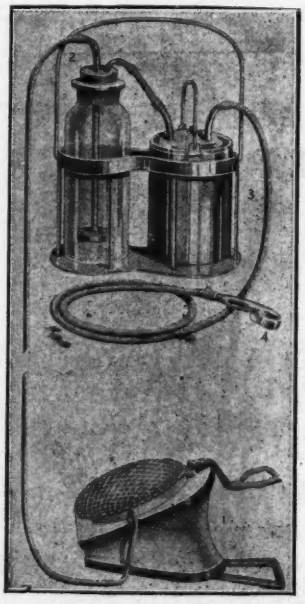

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